

QST

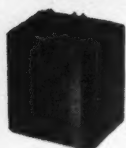
PODUNK HOWL
June, 1951
40 Cents
45c in Canada
RADIO CLUB

entirely to amateur radio

FIELD DAY ORGANIZATION

Equipment	Avail- able	Not available	Promised by
Transmitters			W3ZR W5LPA
100 Watt Phone	✓		
100 Watt CW	✓		
Receivers			W3PC W3ZR
Super-Exalted 22	✓		W3BP
XYZ-105			
Antennas + Masts	✓		W5KE
Rotary Beams Rhombic			
5 Tower	✓		W3LA
One K.W. generator	✓		
Food: Steak, Turkey, Ham + Eggs	✓		

COMPONENTS FOR EVERY APPLICATION



LINEAR STANDARD
High Fidelity Ideal



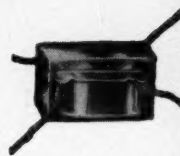
HIPERM ALLOY
High Fidelity . . . Compact



ULTRA COMPACT
Portable . . . High Fidelity



OUNCER
Wide Range . . . 1 ounce



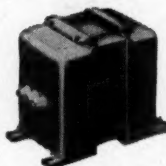
SUB OUNCER
Weight 1/2 ounce



COMMERCIAL GRADE
Industrial Dependability



SPECIAL SERIES
Quality for the "Ham"



POWER COMPONENTS
Rugged . . . Dependable



VARITRAN
Voltage Adjustors



MODULATION UNITS
One watt to 100KW



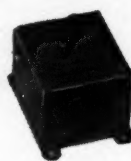
VARIABLE INDUCTOR
Adjust like a Trimmer



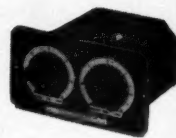
TOROID HIGH Q COILS
Accuracy . . . Stability



TOROID FILTERS
Any type to 300KC



MU-CORE FILTERS
Any type 1/2 - 10,000 cys.



EQUALIZERS
Broadcast & Sound



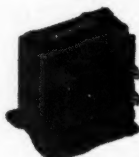
PULSE TRANSFORMERS
For all Services



SATURABLE REACTORS
Power or Phase Control



PLUG IN ADAPTER
Impedance Matching



FOSTERITE
Grade 3 JAN Components



CABLE TYPE
For mike cable line



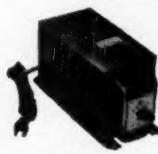
VERTICAL SHELLS
Muskety . . . Inexpensive



REPLACEMENT
Universal Mounting



STEP-DOWN
Up to 2500W . . . Stock



LINE ADJUSTORS
Match any line voltage



CHANNEL FRAME
Simple . . . Low cost

United Transformer Co.

DRIVE WORRIES DISAPPEAR

when you use the "drive-miser"

GL-4D21/4-125A

**Two tubes take 1,000 w CW
with only 5 w to the grids!**

Handicapped by one of those hard-to-drive tubes in your final—so that you wish your grid drive were a little greater?

Then relax! . . . With the same drive you have now, or even less, you can put a signal on the air that equals or surpasses what your rig is transmitting at present. GL-4D21/4-125A will do this for you, with a drive requirement that's ridiculously small.

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See your G-E tube distributor for full ratings and price! Consider the GL-4D21/4-125A in relation to your need for a powerful final that needs only a whisper of grid-drive . . . so that, like a finely made automobile, you can "steer it with your little finger"! *Electronics Department, General Electric Company, Schenectady 5, New York.*



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POWER TETRODE**

Typical Operation, Class C Telephony

Filament voltage	5 v
Filament current	6.5 amp
Plate voltage	3,000 v
current	167 ma
input	500 w
dissipation	125 w
Frequency at max ratings	120 mc

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL  **ELECTRIC**

184-KAB



MAJOR GENERAL JULIAN S. HATCHER
6039 BROOK DRIVE
FALLS CHURCH, VIRGINIA

Mr. Arthur A. Collins, W6CXX
President, Collins Radio Company
Cedar Rapids, Iowa

February 26, 1951

Dear Mr. Collins:

Just eight months ago today you wrote to me about my Collins 75A-1 receiver which had been damaged in shipment from the factory, and you also said that you had noted that I was getting a 32V-2 transmitter, and you expressed the hope that it would operate satisfactorily for me.

I thought you might be interested in seeing the enclosed picture of this fine equipment as it has been in use in my shack.

I want to take this opportunity of telling you that I consider the superb stability and the absolutely accurate calibration of these two equipments to be priceless. It is a real pleasure to operate them, and I think the hams of this country are greatly indebted to you for giving us such fine pieces of apparatus.

We have a sort of family radio net- my oldest son, Commander J. S. Hatcher, Jr., USN, W6OEO, is Electronics Officer of the Naval District at Long Beach, his wife, Mary D. Hatcher, is W6DKV, and my son Lieut. Robert D. Hatcher, USNR, W3RIL, is an engineer on guided missiles for the Navy.

With best wishes, Sincerely,

Julian S. Hatcher
Julian S. Hatcher W4RNQ/A4RNQ

QST

JUNE 1951

VOLUME XXXV • NUMBER 6

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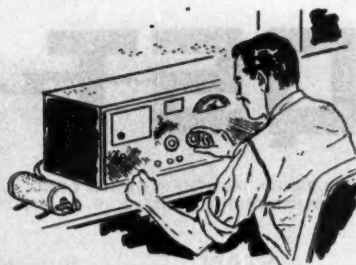
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**Tune your rig for peak output
without creating interference**



Use an **OHMITE** Dummy Antenna Resistor

- **RUGGED VITREOUS-ENAMELED CONSTRUCTION**
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Within their recommended operating frequency ranges, these superior dummy antenna resistors may, for all practical purposes, be considered "nonreactive" in performance.

Write for Bulletin 136

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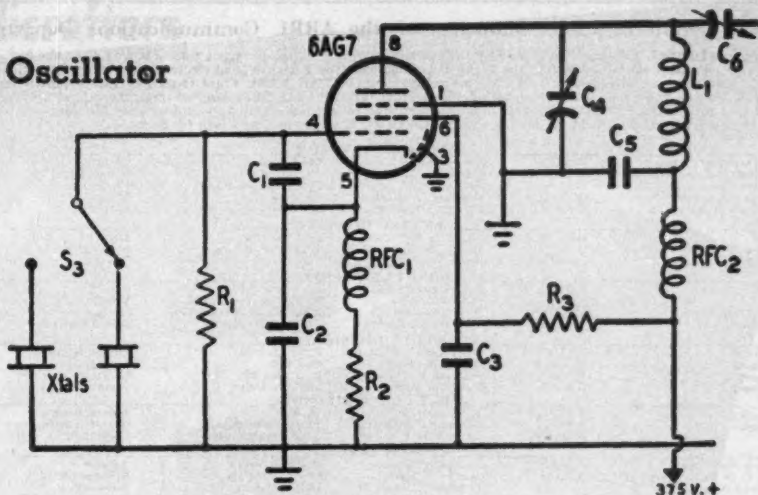


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Reg. U. S. Pat. Off.

RHEOSTATS • RESISTORS • TAP SWITCHES

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C1—15-uufd. mica

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C3—0.002-uufd. mica

C4—100-uufd. variable

C5—500-uufd. mica

C6—7 to 35-uufd. variable

R1—68,000 ohms, ½ watt

R2—500 ohms, 1 watt

R3—47,000 ohms, 1 watt

RFC1, 2—2.5-mh. choke

S3—S.p.d.t. snap switch

L1—(see text below)

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This circuit, containing some of the best features of a number of similar combinations, will give a maximum of trouble-free output with a minimum of crystal current . . . on frequencies up to and including the fourth harmonic of the crystal. It is completely dependable when constructed with proper mechanical care. Using a 6AG7 as a harmonic oscillator sufficient output is generated on the fourth harmonic to drive a 2E26 or similar tube in a following stage or final amplifier.

The circuit is not tricky and crystal heating is held

at a minimum. The crystal will oscillate at all times regardless of whether the plate circuit is at resonance. Pronounced plate current dip will be noticed when the oscillator is tuned to the fundamental frequency, and will become progressively less as higher harmonics are used. The inductance L1 should be designed for resonance at the frequency on which output is desired.

(Note: Additional copies of this circuit may be obtained from your PR Jobber, or directly from the factory.)

PR

Crystals



Since 1934

USE **PR** AND KNOW WHERE YOU ARE

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in **OST: All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* in the United States and Canada are invited to join the ARRL Emergency Corps (ask for Form 7).

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\$169⁵⁰

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6 db down—3 kc selectiv-
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**2 microvolt average sen-
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kc, 1.72-32 Mc in 4 bands.**

**All MARS Frequencies—the only Dual
Conversion Receiver covering all Military
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the hallicrafters co. DATE 4/28/57

ENGINEER'S INSPECTION REPORT

MODEL S-76 SERIAL NO. 184747 CHECKED BY J.H.B.

FREQ IN MC	SENSITIVITY IN MICROVOLTS	SELECTIVITY CONTROL POS.	2X 6 DB	1000X 60 DB
TuLP 1.65		#1 Broad	(KCS)	(KCS)
		#2	5.20	16.0
		#3	2.9	11.8
		#4	1.9	9.3
		#5 Sharp	1.1	4.5
			.76	2.7

IMAGE RATIO	DRIFT	MAX. OUTPUT	DISTORTION	S METER ACTION	A. M. L. OPERATION	AVC OPERATION	RFO OPERATION	DIAL CALIBRATION	R. F. GAIN CONTROL	A. F. GAIN CONTROL
10,000:1	OK	4.1W	7H-15W	OK	OK	OK	OK	OK	OK	OK
4,000:1										
900:1										
800:1										
80:1										

hallicrafters

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WORLD'S LEADING MANUFACTURER OF PRECISION
RADIO AND TELEVISION • CHICAGO 24, ILLINOIS

Dramatic Proof from

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FROM SOLDIERS IN KOREA

c/o Fleet Post Office, San Francisco, California, 14 April, 1951:

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KOREA—38th Parallel—3 April, 1951:

I received my 5-72 and it is performing very well. Because of the mountains here it is almost impossible to receive standard broadcast from Japan during the daylight hours. However, I receive the same programs on short wave during the day and get standard broadcast very good at night. I have been able to pick up London and San Francisco short on that wave.

AMIDONG, KOREA—22 March, 1951:

Hallicrafters 5-72 radio has performed even better than I expected, and the addition of music makes the primitive life here a bit more bearable. We don't feel quite so isolated now that we can hear the news each day instead of waiting for the tardy news papers several days later. The radio will pick up Japan easily on either the standard broadcast band or on short wave; and on the latter you can get Australia (even in the daytime), Manila, Honolulu, and at night with an outside supplementary aerial, San Francisco.

KOREA!

hallicrafters S-72

LONG RANGE PORTABLE

the World's Most Powerful Portable!



Servicemen the world over are recording a new chapter in performance for Hallicrafters famous S-72. This 8-tube masterpiece of precision engineering features the widest frequency range of any portable made—with *continuous coverage* from 540 kc to 30 Mc.*

PRICE: \$109⁹⁵ Less batteries. AC/DC or batteries; brown leatherette cabinet. 61-in. whip antenna for short wave; loop for long wave.

*S-72L, for aircraft and marine band reception, \$119⁹⁵. 175-420 kc plus 540-12.5 Mc.

hallicrafters

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WORLD'S LEADING MANUFACTURER OF
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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.



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VICTOR CANFIELD, W8BSR
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Alternate: George S. Acton, W5BMM
Plain Dealing, La.

Great Lakes Division
JOHN H. BRABB, W8SPF
417 Ford Bldg., Detroit 26, Mich.
Alternate: Harold E. Stricker, W8WZ
247 W. 5th St., Marysville, Ohio

Hudson Division
JOSEPH M. JOHNSTON, W28OX
423 Monmouth Ave., Bradley Beach, N. J.
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91 Atlantic St., North Quincy 71, Mass.

Northwestern Division
R. REX ROBERTS, W7CPY
837 Park Hill Drive, Billings, Mont.
Alternate: Karl W. Weingarten, W7BG
3219 N. 24th St., Tacoma 7, Wash.

Pacific Division
KENNETH E. HUGHES, W6CIS
810 W. Orange Ave., So. San Francisco, Calif.
Alternate: C. Porter Evans, W6BPF
134 Dracena Ave., Piedmont 11, Calif.

Roanoke Division
WILLIAM H. JACOBS, W4CVQ
Route 6, Raleigh, N. C.
Alternate: Gus M. Browning, W4RPD
135 Broughton St., S. E., Orangeburg, S. C.

Rocky Mountain Division
FRANKLIN K. MATEJKA, W0DD
P. O. Box 212, Estes Park, Colo.
Alternate: Ramon S. Walker, W8OWP
P. O. Box X, Brush, Colo.

Southeastern Division
LAMAR HILL, W4BOL
104 Myrtle, Cochran, Ga.
Alternate: William P. Sides, W4AUP
Fleming Road, Montgomery, Ala.

Southwestern Division
JOHN R. GRIGGS, W6KW
10412 Don Pico Rd., RFD 2, Spring Valley, Calif.
Alternate: Walter R. Jones, W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division
A. DAVID MIDDLETON, W5CA
9 Kay Road, Tular, N. M.
Alternate: Frank E. Fisher, W5AHT/AST
104 E. 11th, Pawhuska, Okla.

"It Seems to Us..."



ARMY-AIR FORCE MANEUVERS

Many amateurs — certainly those reservists on active duty at the time — will recall the extensive "Carolina" Army maneuvers in the South during the summer of 1940. This coming August the military has scheduled an operation similar to that of ten years ago but differing in one respect: size. There will be more men, more equipment, more of practically everything, in extensive joint Army and Air Force activities. With the degree of use of radio communications for military operations doubling many times in recent years, the need for frequency channels to service such activity is tremendous, considerably in excess of what is available in Government bands. For some time the military frequency planners have been working with FCC to set up an arrangement providing for temporary but extensive Army radio operations on a considerable number of channels throughout the commercial bands from 4 to nearly 7 Mc.; this has been accomplished. Yet the supply of frequencies was still not sufficient. Reluctantly, the Army sought from the Commission some arrangement whereunder a couple of hundred of additionally-needed kilocycles could be obtained temporarily from the amateur 3.5-Mc. band. (Were this an operation outside the continental United States, there would be no particular problem as the military would simply move into that band, as it has done in wartime and as it continues to do in its Far Eastern operations, inasmuch as a great many military communications units are built with the 80-meter band in mind.) What they hoped for, the military indicated, was that for the 33-day period of the maneuvers amateurs could let 200 kc. of this band pretty well alone so that their low-power portable and mobile units could operate satisfactorily without harmful interference. They had 3800-4000 kc. in mind.

The good faith of the Army in this matter is indicated by its approach. Had the working-level officers so recommended to the top brass, there could have been an Executive Order simply instructing amateurs to clear completely out of the band desired. Instead, the communications group sought the cooperation of amateurs in voluntarily reducing our operations in that portion of the band so that the frequencies could be available for their use. The Commission staff, similarly unwilling to have

the matter handled as a regulations change if possible to avoid it, cooperated and suggested that the League be called in for its comment.

This provided us the opportunity to discuss the problem with both FCC and the military and to make several recommendations, the most important of which was a change in the proposed location of channels to be used in order to lessen the inconvenience to our established amateur operating systems. It's like this, we said: 3800 to 4000 kc. would completely disrupt our amateur 'phone operations, and especially the state and regional emergency and traffic networks. For a day or two that might be okay; for a month, it would be disastrous. It would be much better to use the frequencies 3700-3900 kc., which would divide the inconvenience equally between our voice and c.w. operations.

The discussion group was quick to adopt this view, and even tossed in additional arguments in its favor such as that it would permit the earmarked c.d. band 3900-4000 kc. to remain available for amateur use and planning — just in case. It became the decision of the "committee," and has been incorporated in the final plan. The FCC Public Notice appears in full on page 41 of this issue.

These military operations will take place primarily in the Carolinas, and radiowise will consist of low-power mobile communication — perhaps 10 or 20 watts — both voice and c.w. but mostly the former. Especially with conditions favoring longer-distance propagation on the 80-meter band these days, any normal amateur operation in the same bands would make the channels completely unusable by any such low-power service. What will be needed, then, is protection from harmful interference. The maneuvers will go around the clock for days on end, and of course so will the use of frequencies. For daytime, only a comparatively small "restricted" area of amateur operation would be needed; for nighttime, the protection must be forthcoming from a considerably larger area. Thus it was worked out that amateurs in an area roughly 300 miles around the Carolinas are being requested to conduct no operations whatsoever, daytime or nighttime, in the 3700-3900 kc. band. All other amateurs east of the Mississippi River are being requested to conduct no nighttime operations — local sunset to local sunrise — in the

3700-3900 kc. band. These requests for voluntary cooperation apply only during the period of the maneuvers, August 6th to September 7th. No limitations are suggested for amateurs west of the Mississippi, or in the U. S. possessions.

This request is going to pose some problems for us. In the immediate area where cessation of all operation is requested, for the individual amateur customarily operating in 3700-3900 kc. the solution is simple — he moves to another part of the band during the period of the maneuvers, or to another band. Networks in that area will have to relocate temporarily. These are matters which, however inconvenient, can be accomplished; we've done such things in the past and can do them again. Amateurs outside the immediate limited area but still east of the Mississippi have the same easy solution as individuals, and not quite as difficult a problem in networks at least as concerns the early-evening sessions since in August the sunset times will undoubtedly permit such sessions to continue on their regular frequencies (Daylight Saving Time will help, too). However, networks in this region may prefer to shift to another frequency during the 33-day period so as to be able to conduct their late-evening sessions as well as others on the same channel. And we must admit the arrangement is going to be a little tough on the Novices, who in many cases will have to confine their operations to 11 or 2 meters, or else just sit in the shack and get code practice during the evening hours.

Even with these "restrictions" the Army knows its radio operations in our bands will be no picnic. Especially during the evening hours, some of the signals coming from west of the Mississippi may cause a little trouble. The Army also knows that there is a possibility of an amateur or two getting fouled up somehow and unintentionally causing them interference, but knows the amateur body well enough to be sure such instances will be held to a minimum. An important point to note is that failure of amateurs to hear Army communications in the 3700-3900 kc. band during the period of the maneuvers does not mean that radio operations are not in progress, since the units will be very low-powered. A 10-watt signal can be completely adequate for communication over a 20- or 30-mile range to fit their purposes, though it won't be heard much farther, but would not be usable in the face of high-power amateur interference coming from several hundred miles away.

This is a call for amateur cooperation. It is not a change in amateur rules. It is not a permanent arrangement, as it applies only for the specified month. It is, to quote the Commission's notice, "an opportunity to further enhance the excellent reputation for cooperation which [amateurs] already enjoy." It is a request that we know will be strictly complied with by every amateur.

TVI

There has been increasing grumbling, in recent months, on the part of hams who, having gone to some trouble to clean up the harmonic radiation from their transmitters, still have TVI because many current TV receivers can't take it when a nearby ham goes on the air. It's frequently a hard job to get the idea across to the set owner and even harder, far too frequently, to get any cooperation from the service man, dealer, or manufacturer who ought to fix it up.

The Dallas gang had an idea. It worked, locally. The story is in this issue. No set manufacturer wants to earn a poor reputation for his product. If enough people complain to their dealers, and those dealers can see where they're losing sales, the manufacturer hears about it. And will do something about it — if it doesn't stop with Dallas, but shows up in Omaha, in Sacramento, in Norfolk, in cities all over the country. Your efforts in getting your neighbors to understand, to demand satisfactory performance, to buy the sets that give it and shun those that don't, promises to be a club that will have effect.

Read the Dallas story. If you're really keen on getting something done about TV receivers, go and do likewise. To get action, there's only one place to hit — the pocketbook.

Strays

"What's in a name?" department:

W. F. Ham is W1RRX

M. B. Beam is W5LUP

C. W. Robertson is W5MBP

— W1AGM

OFFICERS' REPORTS AVAILABLE TO MEMBERS

In April of each year the officers of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members. The cost price is 75 cents per copy, postpaid. Address the Secretary at West Hartford.

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

BOARD MEETING HIGHLIGHTS

The Board of Directors of the American Radio Relay League met in a two-day jam-packed session May 11th and 12th in Hartford, Conn., to examine and discuss the affairs of the League and amateur radio.

The Board unanimously voted to adopt a new charter proposed by its Constitution Revision Committee, replacing the original 1915 ARRL charter and modernizing the corporate structure of the League, subject to approval of the new charter by the Secretary of State of Connecticut. The minutes of the Board meeting, to be published in July *QST*, will contain the text of the new charter. New by-laws proposed by the Committee were referred back to it for further study, the present ones remaining in effect insofar as they do not conflict with the new charter.

The Board created a new Policy and Review Committee as a permanent part of our administrative structure, membership to consist of five directors selected in alphabetical order of divisions and rotating in accordance with a specified plan. This new Committee has the power, on its own motion, to make such studies as it chooses of League affairs and report direct to the Board.

Directors unanimously endorsed the Novice and Technician Classes of license and instructed the Headquarters to engage in suitable promotional activity in the form of publicity, booklets and space in *QST* as necessary to meet the needs of these licensees. The Board also directed the staff to institute a membership campaign to secure additional ARRL members, and added some specific suggestions as concerns the placing of solicitations in newsstand copies of *QST*, and the making available to an individual director lists of any members in his division who might not renew at expiration. The Membership and Publications Committee was continued for one year in an advisory capacity in connection with the membership campaign.

The Board expressed its approval of the work heretofore performed by the Hq. staff in tackling the problems of TVI, and further directed the staff to expand and extend its program in an aggressive and cooperative manner to the end that public education, improvement in TV receiver design and other remedial measures might eliminate the controversies between amateurs and the TV viewing public. Suggestions were made on how these ends might be best accomplished. *QST* is to consolidate, no less often than quarterly, informative data on how individual-city TVI problems have been solved, bibliography of TVI articles, and general news on the subject.

Frequencywise, the League will request FCC

to open all 'phone bands to n.f.m. and, as a result of its Planning Committee study and recommendations, to open 7250-7300 kc. to teletype operation using frequency-shift techniques. The Secretary was directed to continue his efforts to obtain increased amateur privileges in the 1800-2000 kc. Ioran band. The Board adopted a resolution soliciting the agreement of Canadian amateurs through Canadian General Manager Reid, to the general principle of VE 'phone privileges extending only 50 kc. additional to U.S. voice bands on 75 and 20 meters instead of the greater portions now available and requesting cooperation of our Canadian members in effecting regulatory action to that end. Given to the Planning Committee for study were the subjects of 40-meter 'phone, tone-shift teletype in 1800-2000 kc., mobile 'phone privileges in 3750-3800 kc., and the possibility of expanding 'phone bands in Puerto Rico, the Virgin Islands and the Canal Zone to the same limits observed by Canada.

FCC will also be requested to amend the amateur rules so as to permit the assignment of two-letter calls to persons who were licensed 25 years ago and who have been licensed for the past 15 years, whether or not they ever held two-letter calls.

The financial position of the League received considerable attention, and the General Manager was instructed to prepare, in advance of each future Board meeting, a statement of estimated revenues and expenses for the current year in the form of a budget. Henceforth, instead of appropriating money from surplus to cover annually-recurring expenses of such things as Board meetings, director administration, SEC, SCM and QSL manager travel, and Board committee operations, these costs will now be charged as regular expenses for the year but only after deriving the figure of net operating revenues.

A section devoted to the activities of YL operators will appear regularly in *QST* beginning no later than next January. Mono County, California, was transferred from the Southwestern to the Pacific Division. The Board commended Walter E. Bradley, W1FWH, for his fine work in conducting the ARRL Technical Information Service. The Communications Manager was instructed to investigate the feasibility of adopting a uniform size for all League certificates. The Board adopted resolutions commending the splendid work of Section Emergency Coordinators, Emergency Coordinators, emergency radio nets and QSL Managers. A rising vote of appreciation was extended to President George W. Bailey, W2KH, on the occasion of his 20th year of service on the Board.

Aurora and Magnetic Storms

The Nature of Ionospheric Disturbances and Their Effect on Radio Communication

BY R. K. MOORE,* W2SNY

"SOMETIMES flames are seen in the sky . . .," wrote Seneca of ancient Rome as he began a description of the aurora borealis.¹ References to aurora appeared even earlier in the Old Testament and the writings of ancient Greece. The ancients frequently attributed aurora to supernatural causes and attached all sorts of significance to its appearance. Today, we know a little more about aurora and can postulate some scientific explanations of it.

The connection between aurora and the earth's magnetism was established long before the days of radio. Soon after long-range radio communication was initiated, it was observed that radio conditions were poor when aurora appeared. In the '30s, amateurs observed another effect² which is just now receiving scientific study: auroral v.h.f. propagation. Because of these effects on radio communication, some knowledge of the aurora should be useful to every amateur.

The aurora is but one manifestation of a more general phenomenon — the geomagnetic storm. Abnormal currents flow in both the earth and the ionosphere at these times. The ionosphere is disturbed even at latitudes where aurora cannot be seen, and the aurora itself appears at the higher latitudes. Both northern and southern hemispheres are affected.

The magnetic field of the earth has been studied extensively. As a first approximation the earth may be considered as a spherical "bar magnet" with its poles slightly displaced from the geographic poles. The north *geomagnetic* pole

* School of Electrical Engineering, Cornell University, Ithaca, N. Y.

¹ Chapman and Bartels, *Geomagnetism*, Vol. I, p. 449. Clarendon Press, Oxford, England, 1940.

² QST, May, 1939, p. 78.

is in Northern Greenland, near Etah. This is different from the magnetic pole normally shown on maps, for the geomagnetic pole is that obtained by considering the earth as a pure spherical magnet. Actually, the field near the surface is somewhat different because of local variations in the earth's structure.

Most of us think of the earth's magnetic field in terms of its effect on a compass, considering it relatively constant except for the slow changes in the correction which must be applied to compass readings. Actually, if one measures the magnetic field precisely, he discovers that it varies quite a bit in the course of a day, even in the absence of any disturbance. The normal daily variation corresponds to a few minutes' (of arc) deviation, both in the direction and the dip angle for a compass needle. There are also annual variations and even tidal variations connected with the rotation of the earth and position of the moon.

In addition to these normal variations we have those due to magnetic storms. At the beginning of a magnetic storm there is frequently an abrupt change in the earth's magnetic field. First comes an increase in the horizontal intensity which lasts for less than an hour, then a decrease for about 12 hours to a point well below the normal value, and then a gradual recovery toward normal which takes several days. Many times the "sudden commencements" have been recorded simultaneously by stations all over the earth. Aurora does not appear until several hours later.

The relatively large changes in the earth's magnetic field cause voltages to be induced in long power and communication lines. Teletype machines print gibberish instead of the intended

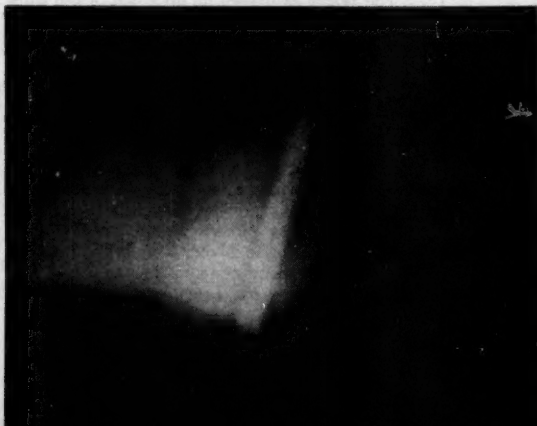
TYPICAL VIEWS

Arc across the northern sky, showing some ray structure. Oct. 16, 1950, 12:20 A.M.



Rayed band in northeast, showing tilt of long rays like dip angle of earth's field. July 21, 1941, 2:09 A.M.

(Photographs by Dr. C. W. Gartlets. From National



messages; trans-Atlantic cable traffic is completely disrupted, and the longer landlines become almost useless.

Magnetic observatories which keep continuous records of the horizontal and vertical components of the earth's field are scattered throughout the world. They have considerable value as predictors of disturbed communications, especially since the earliest stages of a magnetic storm do not seriously affect communications.

In attempts to determine causes of the magnetic variations and what phenomena are related to them, all sorts of things have been compared with the information gathered by the observatories: ionospheric effects, auroral activity, earth currents, sunspot activity, radio noise from the sun, and others.

At a few places on the earth, regular measurements are made of currents (other than man-made) flowing in the ground. Evidence of these currents has been available since about 1847, but instruments capable of measuring them directly were not developed until somewhat later. In their detection, voltages of the order of millivolts must be measured with electrodes separated on the order of a mile. The effect of changes in these currents during geomagnetic storms is to disturb long landlines and cables, but it cannot be separated from the effect of ionospheric currents which flow at such times.

There are a number of ionospheric effects associated with magnetic storms. Radio fade-outs on the sunlit side of the earth, known as "Sudden Ionosphere Disturbances," frequently occur about a day before a magnetic storm. These are usually of fairly short duration, lasting from a half hour to about two hours at the most. They are associated with sudden bursts of ultraviolet light from the sun causing increased ionization of the earth's atmosphere in the region which absorbs radio waves (D region). Their occurrence correlates well with that of solar flares seen by astronomers.

During magnetic storms, the absorption of radio waves is high, particularly in the auroral zones near the magnetic poles. There is a dual

effect on communications because the absorption is increased and the critical frequencies in polar and temperate latitudes are decreased, so that the frequency band over which transmission can take place is narrowed. In the auroral zone radio communication by regular ionosphere reflection may be impossible on any frequency. The ionosphere in the auroral zones is nearly always disturbed, which explains the difficulty in maintaining communication over propagation paths crossing the zone. During times of magnetic storm, however, the disturbed zone expands, and other paths are affected.

Radar-type soundings of the ionosphere at frequencies of 2 to 20 Mc. are made at ionosphere research laboratories. During a geomagnetic storm, instead of a sharp echo from each of the ionosphere layers, they show very broad echoes extending from about where the normal reflection would occur to considerably greater distances. Presumably, this is the result of ionospheric patchiness, with some patches having higher ionization than others. Of course, the ionosphere is not completely smooth at any time, but during a magnetic storm the patchiness is much greater than normal.

The other radio effect which has been noted is one for which hams can take full credit, and in which we are probably most interested: the apparent scattering of v.h.f. signals from the north during a magnetic storm. Usually we speak of this as "auroral propagation," and it probably is scattering from the aurora itself or at least from the same region of the ionosphere. This phenomenon has been known to hams for a long time but it is just now being investigated by scientists.

Aurora

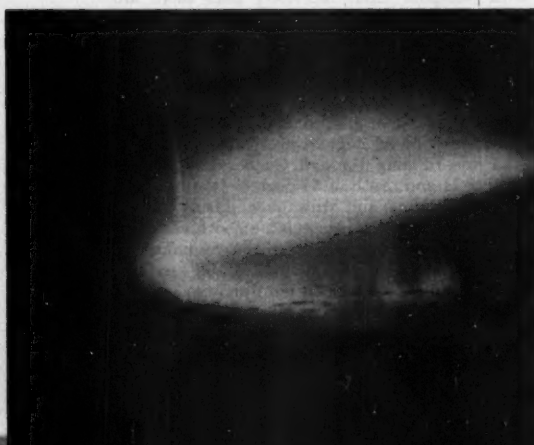
Another aspect of geomagnetic storms is the aurora itself. It may take many forms. To most of us, it normally appears as lights in the north sky; usually greenish-white, but sometimes red, yellow, blue, or even violet. Most of the light of the aurora is usually concentrated in the green. Another reason why we see most auroras as

OF THE AURORA

Elliptical rayed band. This is an earlier stage of the same aurora as at left. 1:59 A.M.

Geographic Society-Cornell University study of aurora

Corona formed by rays of draperies, looking along lines of magnetic force. April 17, 1939, 1:14 A.M.



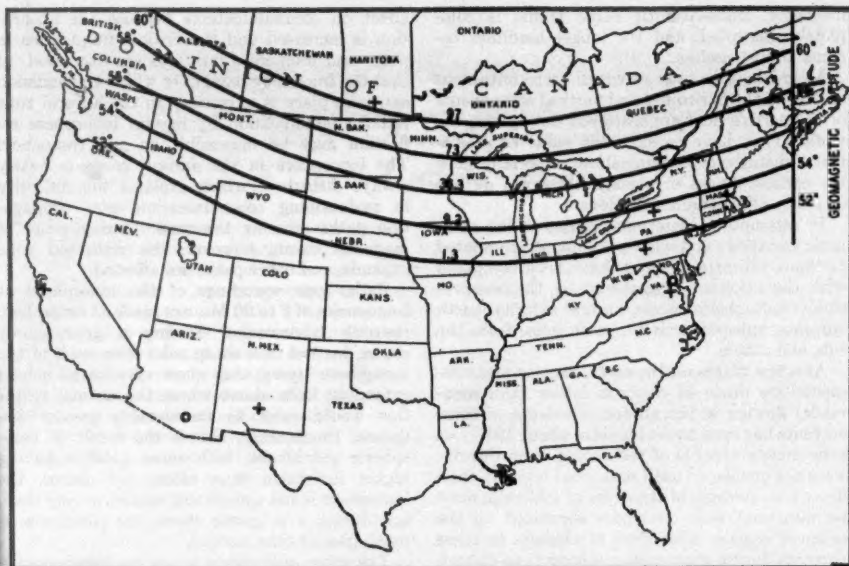


Fig. 1 — Yearly average number of auroras overhead at a given geomagnetic latitude is shown by the number at the middle of the corresponding curve. Crosses and circles are ionosphere and geomagnetic observatories.

green is that the eye is most sensitive to the green light in the aurora, and the light of the smaller auroras is so faint that the other colors simply are not detected by the eye.

The most common form of aurora, other than a diffuse glow, is an arc across the north sky extending from the northwest to the northeast, and a few degrees thick. This is not very spectacular, and in many cases one who is not looking for the aurora may not see it. When a big display comes on a clear night, however, anyone who is away from city lights could not miss it. There may be long rays like searchlight beams extending overhead from the northern horizon; and, in fact, they may come from all around the horizon. There may be bright patches of light overhead, or even in the southern sky. Thick luminous bands may extend from the eastern to the western horizon. Most spectacular is the pulsating or flaming aurora. In one display last year at Ithaca, it looked as though some tremendous gun in the sky were shooting puffs of light from low in the northeast clear to the zenith. The effect was eerie! Although it is impossible to show the aurora fully in black-and-white still photographs, the pictures of the aurora as seen at Ithaca by Dr. C. W. Gartlein shown here give an idea of the appearance of auroral displays.

The aurora can be seen farther to the south than most people realize. There is an aurora almost every night in the auroral zone, a region whose width is a few degrees of latitude centered on a circle about 20 degrees from the geomagnetic pole. The aurora extends south from this region during magnetic storms and has been seen as far

south as the Gulf Coast. Auroras seen in Palestine are recorded in the Bible.

Gartlein has been collecting data on the aurora for the past 12 years from a network of amateur astronomers and other observers scattered throughout the U. S. and Canada. From his work, sponsored by the National Geographic Society, it has been possible to get a pretty good idea of the number of auroras likely to be seen overhead at various places on this continent. The map of Fig. 1 shows the average number per year of auroras overhead on the indicated lines during the period of his study. Under favorable conditions, an aurora may be seen in the north sky from a point hundreds of miles to the south of the point at which it was seen overhead. Hence, it should be possible for an experienced observer to see at least one aurora a year even from the southern part of the U. S.

It is well known that auroras are connected with sunspots; and, therefore, that there are fewer big auroras during the years of low sunspot number (sunspot number is going down now). The correlation between sunspot number and number of auroras is not as great as one might expect, however. Fig. 2 shows the variation in the number of auroras per year seen overhead south of 58 degrees geomagnetic latitude (the line running through Quebec and Duluth on Fig. 1) and south of 54 degrees (the line running near Buffalo and Milwaukee) during the last sunspot cycle.³ While there is a smooth variation of the sunspot number, hitting a minimum in 1943-4 and a maximum in 1947-8, the variation of the number of auroras is not nearly so smooth,

particularly for those seen farther to the north. It can be seen that there was no year in which auroras were not seen overhead south of Buffalo.

There has been much discussion in amateur circles of the month-to-month variation of the number of auroras, and it has always been thought that the months of the largest number of auroras were March and September. Actually, this is roughly true, but auroras have been seen overhead as far south as Connecticut during every month of the year. The way in which the number of auroras per month varies for the same regions used in describing annual variations³ is shown in Fig. 3. It can be seen from this figure that a large number of auroras may be seen in any of the summer months, and the only months during which auroras are really infrequent are January and December. The peak in the spring occurs in March, but the peak of the fall season is in October for small auroras and in August for large auroras. Averaging over a longer period than 11 years would probably show the fall peak in September for both sizes. At any rate, it is apparent that hams can expect considerable auroral propagation in all months except January and December, and occasionally even in these months.

Auroral light originates in the upper atmosphere at heights varying from about 40 miles to as high as 700 miles. Measurements of the height of aurora may be made by taking simultaneous photographs from two or more stations separated scores or hundreds of miles, and triangulating on the basis of the photos. Observers in Norway, working under Dr. Carl Störmer, made 30,000 measurements of the height of auroras during the first half of this century.⁴ These indicate that (at least in Norway) the most common height of the aurora is 60 to 70 miles, which is the height of the ionospheric E layer. Auroral rays are the only forms which extend much higher than this for a large percentage of cases.

In an attempt to discover what the aurora is, a number of scientists have made spectrographic studies of the light from the aurora. From their results it has been determined that a large part of the light is due to oxygen and nitrogen, as we might expect from our knowledge of the lower atmosphere. Hydrogen is also present in the auroral spectrum. Recently, Dr. Gartlein,⁵ and Dr. A. B. Meinel⁶ of Yerkes Observatory have demonstrated that this hydrogen is moving from

outside the earth's atmosphere. The auroral-light display is due to ionization of the atoms of these elements by bombardment from some source (the hydrogen, perhaps) outside the earth's atmosphere.

Theories of Aurora and Magnetic Storms

Scientific theories of the aurora can be divided into two general classes. The first, suggested in 1881, states that the aurora is caused by particles shot from the sun hitting the upper atmosphere. The second, proposed in 1893, suggests that the aurora is caused by intense ionization due to ultraviolet light from the sun. The former

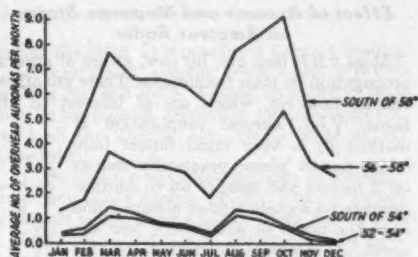


Fig. 3—Monthly variation of number of overhead auroras averaged over 1939-1950. Note the equinoctial peaks.

theory would appear to be the one accepted at present.

In any version of this "corpuscular theory," it is assumed that an ion current of thousands of amperes flows around the magnetic equator in a circle whose diameter is 5 to 6 times that of the earth. This current sets up a magnetic field which opposes that of the earth, and this is the cause of the reduction in the earth's field during a magnetic storm. Some of the particles making up the ring current enter the earth's atmosphere, and their collisions with molecules of air cause emission of auroral light and ionization. The ionization so produced leads to the auroral effects on radio propagation.

Charged particles moving in a fixed magnetic field are forced to travel approximately along the magnetic lines of force. Hence, those causing aurora enter the atmosphere along the lines of the earth's field. Auroral rays show the direction of the earth's field, just as powdered iron particles show that of a bar magnet in the familiar experiment done in all high school physics courses. The lines of force along which these particles usually travel enter the E region about 20 degrees

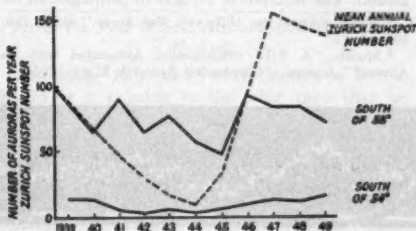


Fig. 2—Number of overhead auroras per year south of a given geomagnetic latitude compared with sunspot number.

³ Gartlein & Moore, "Southern Extent of Aurora Borealis in North America," *Journal of Geophysical Research*, Vol. 56, March, 1951.

⁴ Störmer, "Statistics of Heights of Various Auroral Forms from Southern Norway, Second Communication," *Terrestrial Magnetism*, Vol. 53, p. 251, Sept., 1948.

⁵ C. W. Gartlein, *Physical Review*, Vol. 81, p. 463, Feb. 1, 1951.

⁶ Meinel, *Physical Review*, Vol. 80, p. 1096, Dec. 15, 1950.

from the geomagnetic pole, so aurora is most prevalent at this latitude.

The ring current which disturbs the earth's field is made up of ions which are presumed to come from a disturbed region on the sun. Picture a fire hose on the sun squirting out a stream of such particles. As the sun rotates (one rotation in 28 days) this stream swings through space. If it happens to hit the earth, a ring current is set up and a magnetic storm occurs. Because the speed of the particles is such that they take about 24 hours to get here (light and radio waves take about 8 minutes), the magnetic storm happens about a day after the fade-out due to light leaving the sun at the same time as the particles.

Effect of Auroras and Magnetic Storms on Amateur Radio

Most v.h.f. men are, by now, aware of aurora propagation on their frequencies. There are other effects, however, which are of interest to all hams. V.h.f. auroral propagation is marked by a very rapid flutter fade which makes 'phone practically useless on 2 meters and usually on 6. Aurora-propagated signals almost always come from the north or somewhere near the north. A complete description of this effect is given in the *Radio Amateur's Handbook*.

Recently, W2ZGP has been making signal-strength recordings on 50 Mc. to determine the characteristics of auroral flutter. Such a record is shown on this page. Preliminary analysis of these records indicates the presence of components as high as 2000 cycles in the fading rate, with a peak in the fading-rate spectrum below 100 cycles.

We do not really know just what in the aurora causes this effect. A reasonable explanation is that the particles which cause the aurora cause an irregular ionization in the E region. In fact, it may well be that cylinders of intense ionization are formed along the magnetic lines of force by the incoming particles. These cylinders can act as "antennas in the sky" to scatter the transmitted signals in all directions or at least in some direction.

The flutter may be due to a number of things, such as the motion of the various scattering cylinders causing the signals from different ones to be in phase (add) or out of phase (subtract) as relative distance from the receiver changes. The cause may be the changing numbers and posi-

tions of columns of ionization as more and more particles come in while previously-ionized columns dissipate. It may be due to a Doppler effect caused by the motion of the incoming particles and the increasing length of the ionized cylinders as the particles get closer to the earth. On the other hand, it may be a combination of all of these, or something completely different. We should be able to tell a lot more about this whenever we can get exact information as to the frequencies in the fading.

Previously, no one has known the southern extent of aurora necessary to affect v.h.f. propagation. In work done for the Signal Corps at Cornell, reports of auroral propagation have been compared with Dr. Gartlein's reports of visual aurora, and the results tabulated.⁸ Fig. 4 shows the ratio of the days that ham auroral propagation was reported to the total number of days aurora appeared at given latitudes, expressed as a percentage. Since it turned out that most of

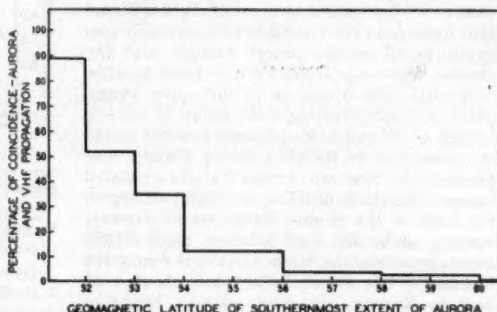
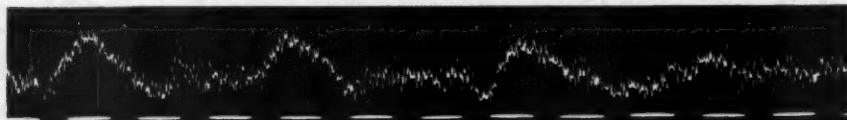


Fig. 4—Percentage of days overhead auroras were seen at a given latitude for which ham reports of aurora propagation were available. Dec., 1939–Nov., 1941; Dec., 1945–June, 1950.

the ham reports were for the periods 1900–0100 EST, a comparison was made in which only auroras seen during those hours were used. If we take the ham reports for the 3-hour periods 1900–2200 and 2200–0100 and compare them with the auroras during the same periods, we have the results shown in Fig. 5. It can be seen that all auroras reported overhead south of New York City (during the hours hams usually operate) were accompanied by reports of auroral propagation. The number of reports of propagation de-

⁷ Moore, "Over the Hills and Far Away," *QST*, Jan., 1951, p. 15.

⁸ Moore, "A VHF Phenomenon Associated with the Aurora?" *Journal of Geophysical Research*, March, 1951.



Aurora-propagated 50-Mc. signal of WHDQ, as recorded at Ithaca, showing rapid fading. The evenly-spaced markers (bottom) are 120 per second. At about 2300 on Feb. 26, 1951, when this record was made, voice was completely unintelligible. Earlier in the same evening voice had been partially readable, the signal curve being much smoother at that time.

creased as the southern extent of the aurora decreased, but was still appreciable for auroras overhead south of Montreal.

Whether the more northerly auroras are not accompanied by strong-enough ionization to cause scattering or whether the majority of the hams are too far south to take advantage of them, is not known at present. By comparing the number of auroras south of a given latitude (Fig. 1) with Fig. 3, you should be able to predict your chances of working aurora DX in a given month, but remember that these are averages and results may be vastly different in a particular year.

Other effects of magnetic storms noted on the ham bands include flutter fading sometimes heard on 40 and 80, and poor conditions on all the bands during magnetic storms. Here in Ithaca, one of our most sensitive indicators of impending magnetic storms is the way in which WWV fades at 2.5 and 5 Mc. after sundown. When it flutters, there is likely to be some sort of magnetic disturbance and aurora though maybe a quite small one.

Actually, in some respects, conditions on the lower-frequency bands may be somewhat improved during magnetic storms. While in polar regions the absorption becomes so high that signals do not get through, in intermediate latitudes the lowering of the penetration frequency and consequent lengthening of the skip may result in improved DX conditions. In the equatorial region, there is actually an increase in penetration frequency and the 10- and 6-meter bands may open for ionospheric propagation.⁹ Remember, though, that if the signal path is in or near the auroral zone, magnetic storms have bad effects.

Scattering similar to that which causes aurora DX at v.h.f. can cause stations well within the skip zone to be heard on the high-frequency bands; for example, 20-meter c.w. stations from distances of 100 miles or less may be heard when the skip is several thousand miles. These signals are always characterized by a hollow sound, presumably the result of a scattering effect related to that which causes the fading described above on v.h.f. signals.

How To Tell When Aurora DX May Be Heard

The flutter fade on 75 or 80 meters or WWV should be a warning to the v.h.f. man that he should dust off his key and listen for weak c.w. signals on 50 and 144 Mc. The propagation condition warnings transmitted by WWV at 20 minutes after and 10 minutes before the hour are a good indication of what may happen. If WWV is sending Ws, it is likely that an aurora may occur

⁹ See Appleton and Pigott, "World Morphology of Ionosphere Storms," *Nature* (London), Vol. 165, p. 130, Jan. 28, 1950, and many reports in *QST* of 6-meter DX to South America.

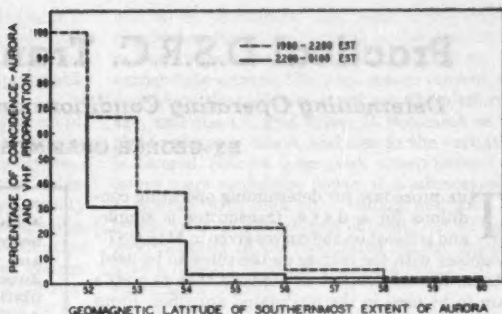


Fig. 5—Percentage of three-hour evening periods.

during the night. It is possible if they are sending Us. Occasionally, auroras occur when WWV is sending Ns, and some of these unpredicted ones may be the biggest. Prediction services cannot be right all the time at the present state of our knowledge!

If you notice a complete fade-out on the high-frequency bands during the day, look for aurora within 24 hours. It may not be there, but there is a good chance that it will. Information on ionospheric disturbances, as predicted by CRPL, is transmitted nightly by the ARRL Headquarters Station WIAW during regular bulletin periods.

How much remains to be learned about aurora is indicated by questions sent me by Ed Tilton, WIHDQ, *QST*'s v.h.f. editor: What type of aurora produces strongest v.h.f. signals? What is the maximum frequency for reflection? Is there a frequency/brilliance correlation? The answer to all these questions and others is "Nobody knows!"

It may be that the amateur can contribute to this knowledge. If you would like to help, send reports of auroral v.h.f. propagation to Ed Tilton at ARRL. For greatest value they should include the following data:

On the station: Location (latitude and longitude if possible), description of antenna (or gain and beam width), transmitter power, receiver sensitivity (if known).

On the contact: Band, time, call and/or location of station heard or worked, beam direction for best results, signal strength, and readability of modulation, if any.

Aurora Observers Needed

Dr. Gartlein can always use more reports of auroras seen. If you are interested in participating in this scientific investigation of aurora, write him and he will send you reporting forms and stamped self-addressed envelopes. His address is: C. W. Gartlein, Department of Physics, Cornell University, Ithaca, New York.

Acknowledgment

Some of the results quoted here were determined at Cornell with the support of the U. S. Army Signal Corps and the National Geographic

(Continued on page 110)

Practical D.S.R.C. Transmitter Design

Determining Operating Conditions and Circuit Requirements

BY GEORGE GRAMMER,* W1DF

THE procedure for determining operating conditions for a d.s.r.c. transmitter is simple, and is based on the curves given in May QST¹ together with the ratings on the tubes to be used. As an illustration, let us suppose that two 807s are to be used in the modulated amplifier. From the published tube data, the rated plate dissipation for an 807 is 30 watts and the recommended operating conditions for plate-modulated telephony are:

Plate voltage — 600 volts
Plate current — 100 ma.

For grid modulation, the maximum permissible d.c. plate voltage is twice the plate-modulation rating, or 1200 volts, and the maximum permissible peak plate current is twice the plate-modulation rating, or 200 milliamperes.² These limits should not be exceeded, but they do not necessarily represent values that will be used.

The modulation factor m may be chosen arbitrarily, but for reasons discussed a little later we shall in this case select a modulation factor of 4. The permissible peak input may then be determined from Fig. 7, May QST, page 15, which shows that when $m = 4$ the plate loss in the carrier tube is 17% of the peak input, assuming a peak efficiency of 66%. Hence the peak power input will be 30/0.17, or 176 watts. The peak output is $176 \times \frac{1}{2}$, or 117 watts. From Fig. 3, May QST, page 14, the sideband power is 32% of the peak output power when $m = 4$, so the sideband output is $117 \times 0.32 = 37.5$ watts. From the same figure, the d.c. power input without modulation is equal to 20% of the peak power input, and so is $176 \times 0.2 = 35$ watts. The unmodulated carrier output is equal to 4% of the peak power output, or $117 \times 0.04 = 5$ watts, approximately. From Fig. 6, May QST, page 15, the power input with full sine-wave modulation is 53% of the peak power input, or $176 \times 0.53 = 93$ watts.

It is now possible to determine the plate voltage limits. At the maximum permissible peak plate current, 200 ma., the plate voltage required for the peak input power is $176/0.2 = 880$ volts. Hence the d.c. plate voltage may have any value between 880 and the maximum rating of 1200 volts, the peak plate current being determined accordingly. If possible, a fairly high value of plate voltage should be used because it is accompanied by a lower value of peak plate current, which reduces the demands on the modulator. In general, it is advisable to use a plate voltage/peak plate current ratio at least as large as that recommended for plate modulation. In the pres-

• This article outlines the method for arriving at suitable operating voltages and currents for double-sideband reduced-carrier telephony using grid modulation. As a practical example, circuit details and adjustment procedure are given for a 75-meter transmitter using a pair of 807s. Although the plate power input to the entire transmitter, both r.f. and audio, averages less than 100 watts, the sideband power output is almost the same as is obtained from the same tubes at the full plate-modulation ratings.

ent case, the plate-modulation ratio is 600/100 = 6. Approximately this same ratio will be secured with a plate voltage of 1000, in which case the peak plate current for 176 watts peak input will be 176 ma. From Fig. 6, May QST, the average plate current for both tubes with full sine-wave modulation will be $176 \times 0.53 = 93$ ma. The unmodulated d.c. plate current will be, from Fig. 3, May QST, $176 \times 0.2 = 35$ ma. Summarizing, the operating conditions are:

Plate voltage.....	1000 volts.
Plate current without modulation.....	35 ma.
Plate current with full sine-wave modulation.....	93 ma.
Carrier output.....	5 watts.
Sideband output, full sine-wave modulation.....	37.5 watts.
Total power output, full modulation.....	42.5 watts.

The sideband power output of 37.5 watts corresponds to a 75-watt carrier with 100% modulation. It is of interest to note that the plate modulation ratings of two 807s show a carrier output of 84 watts (42 watts per tube) and a d.c. input of 120 watts with or without modulation. The "talk power" of the two tubes with ordinary plate modulation is only slightly more than with d.s.r.c. at $m = 4$, but plate modulation requires a modulator capability of at least 60 watts audio output, and uses considerably more d.c. power.

Modulator Requirements

As stated earlier, the selection of the modulation factor may be arbitrary, but some practical considerations need attention. Assuming that the tubes are to be screen-modulated, an increase in the modulation factor will require an increase in both the audio voltage and power supplied to the screens. In the case just considered, it is desirable for reasons of economy to limit m to a figure that will permit using for the modulator a single receiving-type power tube operating from a

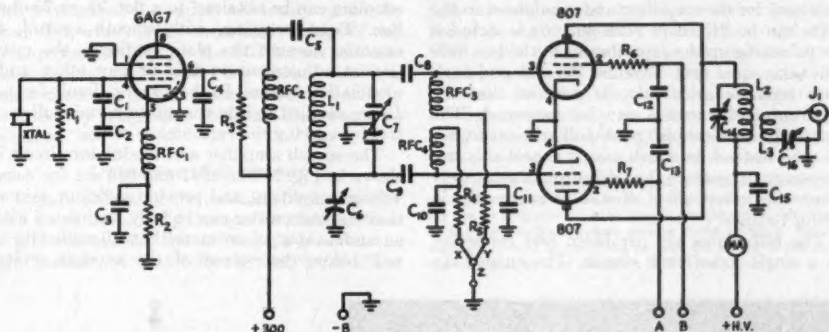
* Technical Editor, QST.

¹ Grammer, "D.S.R.C. Radiotelephony," QST, May, '51.

² Technical Topics, "Design Limits for 'High-Output' Grid Modulation," QST, February, 1951.

In general, the peak screen voltage needed to drive the carrier tube to the maximum peak-current limit will be about twice the screen voltage recommended for plate modulation, and the voltage required for other values of peak current

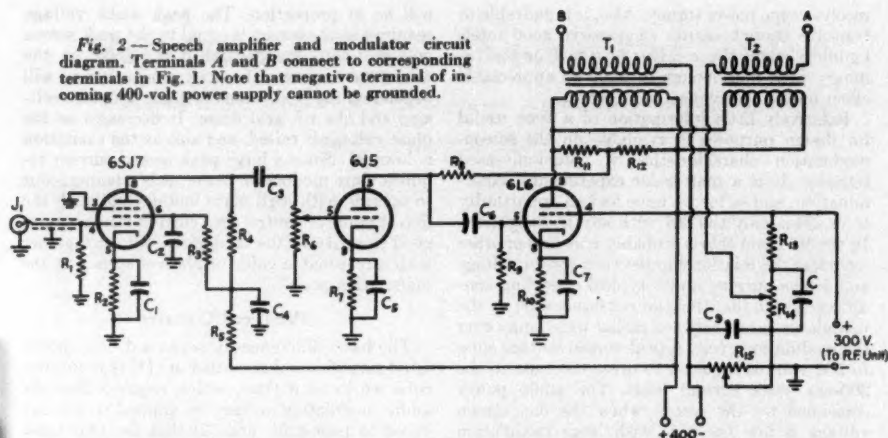
The r.f. circuit used in the test transmitter shown in the photographs is given in Fig. 1. It was built primarily for the 3.5-Mc. band and uses a crystal oscillator to drive the modulated ampli-



C₁—10- μ fd. mica.
C₂—50- μ fd. mica.
C₃, C₄—0.01 μ fd. ceramic.
C₅—100- μ fd. mica.
C₆—3-30 μ fd. ceramic trimmer.
C₇—140- μ fd. per section, 500 volts (Millen 23140).
C₈, C₉—470- μ fd. mica.
C₁₀, C₁₁—0.005- μ fd. ceramic.
C₁₂, C₁₃—0.002- μ fd. mica.
C₁₄—250- μ fd. variable, 1500 v. (National TMK-250).
C₁₅—0.001- μ fd. mica, 1200 v. wkg.
C₁₆—300- μ fd. variable, receiving type (National SEH-300).
R₁—0.1 megohm. $\frac{1}{4}$ watt.

- R₂** — 220 ohms, $\frac{1}{2}$ watt.
R₃ — 47,000 ohms, 1 watt.
R₄, R₅ — 15,000 ohms, 1 watt.
R₆, R₇ — 47 ohms, $\frac{1}{2}$ watt. (Parasitic suppression.)
L₁ — 1-inch winding of No. 28 enameled on $\frac{1}{2}$ -inch diameter form, shielded (Millen 74002 form).
L₂ — 15 turns No. 12, 2 $\frac{1}{2}$ -inch diameter, 6 turns per inch (B & W 2905-1).
L₃ — 14 turns No. 14, 2 inches diameter, 8 turns per inch (B & W 3900).
J₁ — Coaxial output connector.
MA — 0–200 d.c. milliammeter.
RFC₁ — RFC₄, inc. — 2.5-mh. r.f. choke.
NOTE: **L₂** mounted with $\frac{1}{4}$ of its length inside cold end of **L₁**.

Fig. 2—Speech amplifier and modulator circuit diagram. Terminals A and B connect to corresponding terminals in Fig. 1. Note that negative terminal of incoming 400-volt power supply cannot be grounded.



C_1, C_6, C_7 —20- μ fd. 25-volt electrolytic.
 C_2 —0.1- μ fd. paper.
 C_3 —0.0015- μ fd. mica.
 C_4 —8- μ fd. 450-volt electrolytic.
 C_5 —0.01- μ fd. paper.
 C_6, C_7 —8- μ fd. 150-volt electrolytic.
 R_1, R_2, R_3 —1 megohm, $\frac{1}{2}$ watt.
 R_4 —1000 ohms, $\frac{1}{2}$ watt.
 R_5 —0.22 megohm, $\frac{1}{2}$ watt.
 R_6 —47,000 ohms, $\frac{1}{2}$ watt.
 R_7 —1-megohm volume control.
 R_8 —2200 ohms, $\frac{1}{2}$ watt.
 R_9 —0.1 megohm.
 R_{10} —500 ohms, 5 watts.

R_{11} —47,000 ohms, 1 watt.
 R_{12} —27,000 ohms, 1 watt.
 R_{13} —5000 ohms, 10 watts.
 R_{14} —5000-ohm adjustable, 25 watts.
 R_{15} —1000-ohm adjustable, 25 watts.
 J_1 —Microphone connector.

T_1, T_2 —Driver transformer, adjustable ratio. (Stancor A-4752.)

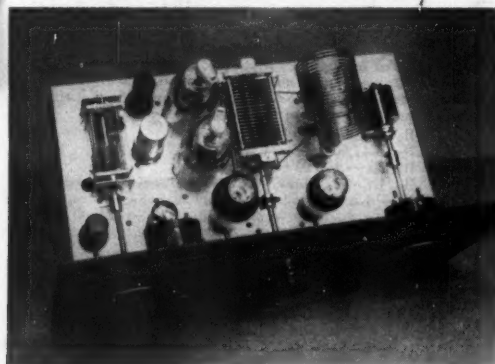
NOTE: T_1 and T_2 must be connected so that the secondary voltages add, between terminals A and B. The full secondary winding is used, and primary taps are selected to give a turns ratio, primary to whole secondary, of 1.5 to 2 (brown and yellow leads).

fier. The oscillator plate tank circuit is also the grid tank for the amplifier, and is balanced so the grids can be driven in push-pull. C_6 is included for balancing up the capacitances so the two 807s will take equal grid currents. Parallel grid feed, with separate grid leaks, is used so that the separate grid currents can be measured. The customary link-coupled push-pull grid circuit can be used instead, in which case it is probably unnecessary to measure the grid currents separately since the link-coupled circuit is inherently in better balance.

The 807 plates are paralleled and connected to a single-ended tank circuit. The output cir-

cuit, L_3C_{16} , is proportioned so that sufficient coupling can be obtained to a flat 50- or 75-ohm line. Tight coupling, with smooth control, is essential because the plate loading is the most critical adjustment in this or any other grid-modulation system. In the present circuit L_2 and L_3 are coupled tightly enough to permit full control by varying the capacitance of C_{16} .

The speech amplifier and modulator circuit is shown in Fig. 2. The 6SJ7 and 6J5 are the usual voltage amplifiers, and provide sufficient gain so that the transmitter can be fully modulated with an audio input of no more than 10 millivolts—well below the output of the average crystal



This transmitter unit incorporates a number of modifications for testing with other types of modulation but which are not essential to d.s.r.c. These modifications are omitted in the circuit diagrams of Figs. 1 and 2.

The r.f. section occupies the rear section of the chassis. A shielded grid coil is necessary to prevent self-oscillation. In the front section, the two tubes at the left are the audio voltage amplifiers and the 6L6 modulator is in the center. The tube at the right was incorporated for testing with clamp-tube carrier control and does not appear in the circuit diagram.

The unit shown was constructed by W1LOP.

microphone. Low-frequency response is cut by using a small value of capacitance at C_3 . The 6L6 circuit is not quite what we would prefer, but since there seems to be no suitable split-secondary transformer available, two driver-type transformers were used with their primaries in parallel. This leaves the combined audio outputs of the two secondaries somewhat at the mercy of phase shifts in the two individual units, but the over-all performance is reasonably satisfactory. These effects are minimized by using 0.002- μ fd. by-passes on the screens of the 807s.

Because the load represented by the screen varies rather drastically, and because of the effects that occur when the load shifts from one transformer to the other on alternate halves of the audio cycle, a negative feed-back circuit is used with the 6L6 to minimize distortion. This consists of the voltage divider, $R_{11}R_{12}$, with the plate resistor, R_8 , of the 6J5 connected to the junction so that some of the voltage developed in the 6L6 plate circuit is fed back in the proper phase to the grid. The feed-back voltage was made as large as possible without going to the point where an additional voltage-amplifier stage would have been required because of the reduction in gain.

The two circuits of Figs. 1 and 2 are arranged so that a single supply having an output voltage of 375 to 400 will handle both the speech equipment and r.f. oscillator, and will also supply the d.c. biasing voltages for the screens. The negative bias for the 807 "negative-peak" tube is obtained by taking the drop across R_{15} , through which the entire supply current (100 ma.) flows. The negative terminal of the supply obviously cannot be grounded, which is the only disadvantage of this arrangement. Although the 807 screen currents vary during modulation, the currents are too small in comparison with the load on the supply to cause any appreciable change in the screen bias voltages.

Operating Adjustment

The adjustment of the modulated r.f. amplifier with d.s.r.c. is basically the same as with any form of grid modulation. An oscilloscope is about the only instrument that tells the real truth about

the modulation characteristic in either case. However, when the transmitter design has been proved out beforehand, it is possible to reach the proper operating conditions without an oscilloscope. For example, in the case of the circuits of Figs. 1 and 2, it is known that the modulator will handle, without excessive distortion, a pair of 807s operating with the voltages and currents listed earlier. The only accessory required is a tone source, of reasonably good waveform, to replace the microphone while adjustments are being made.³

Assuming that the tube combination shown is to be used, the first step is to adjust R_{15} so that the voltage between the 300-volt terminal and chassis is actually 300 volts, with the crystal oscillator and all speech tubes operating. Depending on the supply voltage, the drop between the negative terminal of the supply and chassis should be 75 to 100 volts, preferably about 80. The tap on R_{14} should then be adjusted to give 75 volts to chassis.

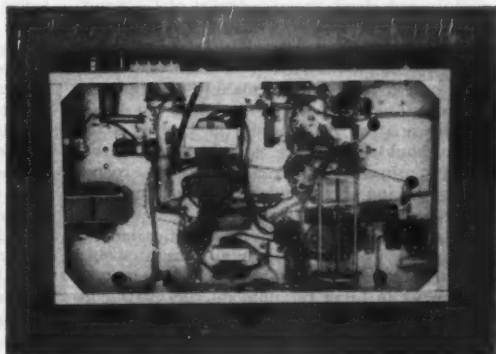
Turn the a.f. gain off and apply 1000 volts to the plates of the 807s, adjusting the excitation (by detuning the grid tank) for 5 to 6 milliamperes grid current (total). Check the individual grid currents, and adjust C_5 to make them equal. It may be necessary to switch the meter back and forth a few times, since adjusting C_5 affects both currents. This adjustment need be made only once, and it is satisfactory to have the currents balanced within 10 per cent.

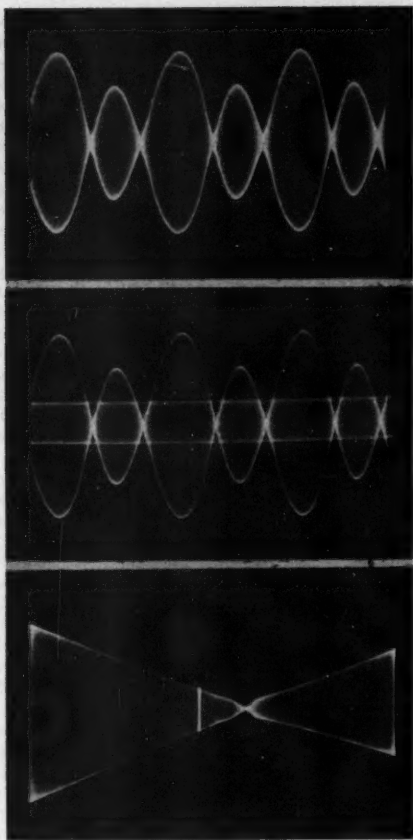
Next, set the output control, C_{16} in Fig. 1, at minimum and resonate the amplifier plate tank, tuning for the usual dip. Because only the carrier tube is working, and that at low screen voltage, the plate current will be small. Then, with the tone source connected to the microphone input terminals, turn up the audio gain a bit and note whether swinging the plate tank condenser through resonance causes a pronounced dip. If it does, increase the loading by means of C_{16} until

³ A simple tone oscillator circuit is given in the chapter on measuring equipment in the *Radio Amateur's Handbook*. Its use in conjunction with speech equipment is described in the section dealing with testing audio systems. An attenuator should be provided so that the input to the first speech amplifier is of the order of 0.01 volt.

A bottom view of the chassis. The switch section near the 807 sockets at the upper right was incorporated for connecting the grids either in parallel or push-pull, and the wiring can be simplified considerably by the straight push-pull connection shown in Fig. 1. The tube and component layout shown can be followed, but much of the wiring obviously can be eliminated when the circuits are hooked up as shown in the diagrams.

The two transformers for the 6L6 are near the center; they both bear the same type number, although one is a wartime "victory" model. The resistors for developing bias for the 807 screens are in the upper left corner.





Typical oscillograms of a d.s.r.c. signal, illustrating both wave-envelope and trapezoidal patterns. To determine the modulation factor measure the pattern height and also the height of the unmodulated carrier. The ratio of the former to the latter is equal to $(m+1)$ in the case of the up-peak, or $(m-1)$ in the case of the down-peak.

the dip is just noticeable. Increase the audio gain slightly and check the adjustment of C_{16} again. Continue in the same way until the plate current reaches 93 ma. with the plate tank resonated. Swinging the tank condenser off resonance should show only a very small increase in plate current — about 2 ma., just enough to locate the dip. If the dip is at all pronounced the loading is too light. Should this be the case the amplifier will take the proper plate current only at the expense of overdriving the modulator and setting up a great deal of audio distortion.

On cutting off the audio after reaching the conditions described above, the plate current should drop to 35 ma. If it does not, R_{14} (Fig. 2) may be readjusted to bring the unmodulated plate current to the proper value. A smaller no-modulation plate current will reduce the carrier output —

that is, increase the modulation factor above the design figure — and a larger value of plate current may increase the carrier-tube plate dissipation slightly over the rating.

With voice modulation the plate current will not reach the same maximum value as with tone. Using the constants given in Fig. 2 with a good-quality microphone, an average voice will cause the plate current to kick up to about 50 milliamperes when fully modulating, with an occasional peak reaching 60 ma. This behavior is comparable with the plate-current variations in a Class B audio amplifier when voice and steady tone are compared. The cheaper microphones probably will show somewhat higher plate-current values, since they usually have a lower peak-to-average ratio than the more expensive types.

Adjustment with the Oscilloscope

Using an oscilloscope makes the adjustment procedure quick and certain. Either the trapezoidal or wave-envelope patterns may be used — both, if possible, because each gives information that supplements the other. In this method, also, it is desirable to have an audio oscillator with reasonably good waveform, to substitute for the microphone while testing.

The group of oscillograms shown in the photograph are typical of what is to be expected. These pictures were taken with 400-cycle tone modulation, using the transmitting unit shown. The top photograph is the wave-envelope pattern with the modulation factor adjusted to be close to 4. The amplifier was operating with 1000 volts on the plate and the plate current was 93 milliamperes. The center photograph shows the same pattern, but with the unmodulated carrier superimposed (by double exposure on the film) to show the relationship between carrier alone and full modulation. The photograph at the bottom shows exactly the same signal with the trapezoidal pattern. The bright line to the left of the cross-over point is the unmodulated carrier, superimposed on the modulated picture.

In adjusting with the oscilloscope the plate loading and audio gain should be set to give patterns like these, simultaneously with attaining the calculated modulated-amplifier plate current. When the proper conditions have been reached, a further increase in modulating voltage should cause the points on the carrier (left-hand) side of the trapezoid to flatten. With the wave-envelope pattern the tips of the larger peaks should flatten under the same conditions. This indicates that the peak linear output is secured just before overload occurs, and that the maximum possible output is being secured.

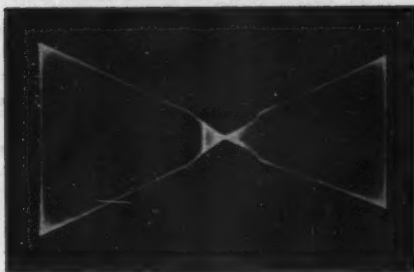
The trapezoidal pattern is more useful than the wave envelope for indicating linearity. The wave-envelope pattern in the photograph appears to be a fairly good sine wave when the outline of the envelope is followed through the cross-over point, but the nonlinearity is obvious in the double trapezoid. The kink near the cross-over point is principally due to the inherent nonlinearity of screen modulation near zero screen voltage. Zero

voltage on the screen does not completely cut off the output, and it is necessary to drive the screen about 25 volts negative to bring the output to zero. In this region there is a considerable change in the output vs. screen voltage ratio, so that the slope of the characteristic changes. This introduces some distortion. The trapezoidal pattern in the photograph also shows that the modulating voltage was not a true sine wave, since the distance from the carrier line to the left side of the pattern is not exactly the same as the distance to the right-hand side. Inasmuch as the input signal used for the test was a rather good sine wave, this indicates that distortion, especially of the even-harmonic type, was set up in the modulating system.

An ideal trapezoidal pattern would have perfectly straight sides and each side of the smaller wedge would be a continuation of the side of the larger. The pattern in the photograph is quite apparently not ideal. The distortion was checked by using a 1000-cycle tone and measuring the amplitudes of the sideband components on a receiver with a sharp crystal filter, with the transmitter fully modulated. The most important spurious components were found to be the second and third harmonics of the modulating frequency, corresponding to side frequencies spaced 2000 and 3000 cycles, respectively, each side of the carrier. The second harmonic was 22 db. below the fundamental or principal sideband (1000 cycles from the carrier) and the third harmonic was down 27 db. These correspond to 8% and 4.5% distortion, respectively. The total r.m.s. distortion, including all sideband components having a level of more than -50 db., was just under 10%. This is the distortion from microphone input to antenna, and is of the same order as the distortion in conventional modulation systems. The second harmonic was principally in the audio system and readily could have been reduced by more conservative design.

The single photograph of a trapezoidal pattern shows the effect of omitting the negative bias on screen of the negative-peak tube. There is a rather abrupt change in the slope of the sides of the pattern in the region where both tubes are delivering power simultaneously. As explained in May *QST*, when this occurs the outputs of the two tubes are bucking. Distortion is increased, but of equal importance is the fact that the carrier lies in this region and is therefore considerably smaller than is desirable for the amount of peak power available. Although the peak power in this pattern was the same as in the others, the modulation factor increased to about 6. The larger modulation factor increases the distortion in "straight" reception, with no compensating gain in effective power output. The screen bias on the negative-peak tube should be adjusted so that corresponding sides of the larger and smaller wedges together form as straight a line as can be obtained.

It should be emphasized again that the circuits described here are by no means the only ones that can be used. For example, control-grid mod-



Trapezoidal pattern obtained when the screen of the negative-peak tube has no bias.

ulation can be used instead of screen modulation. The two tubes in the modulated amplifier do not have to be the same type, a feature that may be of particular interest when higher power is used. On the other hand, it may be that better all-around performance can be obtained by using a low-level balanced modulator and following it with a linear amplifier; we know that the linearity is better with this method, and it has the advantage that it incorporates one more of the necessary steps toward single-sideband transmission!

Strays

Were you the holder of a first- or second-class commercial telegraph license any time during 1940 through 1950, which has since expired? If so, you can now apply to any district FCC office for the newly-reestablished Temporary Limited Telegraph Second Class license with a minimum examination consisting mainly of a 16-w.p.m. code test. The "TLT" license will be valid for shipboard operation only. This action has been taken to help fill the current shortage of ship radio officers. American Radio Association, 5 Beekman St., New York City, can supply full details on openings with a wide choice of jobs paying between \$100 and \$200 per week, including overtime and bonus.

A network of mobile and fixed stations was established by the Milwaukee Radio Amateurs' Club during the recent visit to that city by General of the Army Douglas MacArthur. Three cars met the General's motorcade at the Illinois-Wisconsin state line and dispatched bulletins on the General's progress through the lake-shore communities. The bulletins were relayed to two fixed stations in the Milwaukee area and then telephoned to the police department, newspapers, and all radio stations in the city. Twenty-five members participated in this demonstration of communications facilities, Fred H. Zolin, W9ONY, club president, reports. Arrangements and conduct of the operation were under the direction of Charles Kaetek, W9SNK.

The Dallas Plan for TVI

A Course of Action That Got Results

BY J. F. SKELTON,* W5MA, AND E. M. SHOOK,** W5IT

THIS is a story of TVI due to front-end deficiencies in TV receivers and what the Dallas amateurs have done about it. Too little has been said about how susceptible TV receivers are to interference from amateur fundamental signals.

The TV situation in Dallas includes two local TV stations on Channels 4 and 8 and a Channel 5 station in Fort Worth, approximately 35 miles away. With a good outside antenna, the signal from the Channel 5 station in Fort Worth is just strong enough to get consistently good quality pictures, provided there is no interference present. Most TV viewers in Dallas demand Channel 5 pictures and this results in a high concentration of TV sets in a near fringe area.

After the Fort Worth station went on the air in 1948 practically every amateur in Dallas shut down because of TVI, despite the fact that there are no harmonics from amateur operation at 14 Mc. and above which fall into that channel. Yet practically all TV receivers up to several hundred feet from the amateur suffered interference on Channel 5, varying from mild to destructive when these transmitters were on the air. The answer obviously was that the selectivity of the TV sets was so poor that the amateurs' fundamental signals caused interference to the picture or sound or both. In some cases the interference was a combination of overloading plus other complications. In many cases the picture would go negative and some would go out of sync. In some cases where the transmitter was keyed, the picture would get dim and bright. Other milder forms appeared as crosshatched and herringbone patterns. These types of interference were prevalent from harmonic-free amateur transmitters operating on all popular bands down to and including 80 meters.

Those amateurs most active in determining these facts were appointed to the Dallas Amateur Radio Club TVI Committee¹ and were instructed to continue the investigation and to take appropriate steps to get relief.

At the outset some TV owners were eager to buy the necessary high-pass filter which when properly installed usually eliminated all traces of interference. Not all TV owners were so inclined and, where the TV dealers also were not so inclined, the result was a number of stalemates. Consequently, very few TVI cases were cleared up. It was evident something more general and positive was required.

The TVI Committee prepared and circulated a pamphlet to all TV dealers and servicemen, introducing to them the problem and pointing out how they could and should correct the offending TV sets.

A few days later the TVI Committee circulated a bulletin to all Dallas amateurs urging them to get back on the air and make the simple test of temporarily installing a high-pass filter in their neighbor's TV antenna lead-in. If this cleared the interference, it was proof that the TVI was getting into the set by way of the antenna on a frequency below the TV channels. A similar check using parallel-tuned traps in series with the lead-in was also suggested. All amateurs free of harmonic TVI were urged to continue operation during TV hours and force the issue to a showdown. It was obvious that the responsibility for this type of amateur TVI should be placed squarely on the manufacturers of the TV sets.

A check-up on all the initial TVI case histories involving harmonic-free amateur stations revealed some makes and models of TV sets to be poorer than others in their ability to reject the amateur's fundamental. RCA sets were found to be particularly susceptible to amateur fundamentals. For example, RCA sets six or more blocks away experienced severe interference while at the same time most other makes of TV sets 500 feet away had much less TVI and in some instances none at all. The newer models of RCA sets were more susceptible to amateur fundamental signals than some of the older models. About the time this condition was determined, a number of unqualified, uninformed, and irresponsible TV servicemen added further to the difficulties of the Dallas amateurs by telling the TV owners that all the trouble was due to faults of the amateur stations.

This situation called for drastic action. It was determined that the most effective way to ensure action was to go right to the top of the RCA organization, and accordingly, two letters were written to Mr. David Sarnoff, chairman of the board. These listed a number of case histories, giving names and addresses of TV owners, distances from the amateur station, model of set, set forth such corrective steps as had been attempted, and demanded that the manufacturer take steps to correct all such offending TV sets. In the meantime all harmonic-free amateurs stayed on the air during TV hours. Each complaint was checked and verified to be lack of discrimination against the amateur fundamental with the TV owner looking on. Insofar as possible the TV owner was told what the basic trouble was and advised to take the matter up with his

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¹J. F. Skelton, W5MA; Baily Bartel, W5LJC; E. C. Bureh, W5CAE; E. M. Shook, W5IT.

dealer. Each time a complainant reported what his so-called technician had said, the amateur held his ground and continued to operate. The parade of TV owners back to the TV dealers also was receiving some notice. It is known that at least two customers returned their sets to dealers and got their money back. Many TV owners had complained to FCC, some at the suggestions of the misinformed TV servicemen. This possibility was not overlooked by the amateurs involved and the FCC was in many cases previously informed and FCC was able to give the TV owners a good idea of the basic trouble. Where the facts were not known, FCC actually made tests. Where the amateur was free of harmonic radiation, FCC advised the TV owner. Where the amateur was radiating in or near the TV channels (fortunately this was rare in this particular group of amateurs), the amateur was so informed and he shut down without argument.

As a result of the exchange of correspondence with Mr. Sarnoff and the continuing activities of the Dallas amateurs, RCA sent two engineers to Dallas to investigate. Over a period of four days the TVI Committee demonstrated to these engineers all of the facts previously reported. They, with the RCA-Victor engineer stationed in Dallas, corrected several RCA TV sets during their investigation. Speaking for RCA they agreed to doctor every offending RCA TV set to the complete satisfaction of both the TV owner and the amateur, regardless of the status of any existing or nonexistent service contract. They set up a workable procedure for RCA Service Company in combination with their RCA-Victor engineer in Dallas to fix or have fixed all such cases of amateur TVI. The machinery as set up is working satisfactorily and RCA is carrying out its commitment. One example may be cited. Recently two local amateurs finished off a 20-meter 'phone QSO with the announcement of their telephone numbers and a request for a call from all RCA TV owners who were having TVI from their stations. One of these amateurs received 14 calls from an area within $\frac{1}{2}$ -mile radius. These 14 cases of TVI on RCA receivers were corrected within 24 hours after being reported! Many more RCA sets have been corrected in a less dramatic fashion. In addition to this correction of amateur TVI, other forms of TVI originating on frequencies below the cut-off of the high-pass filters have also been eliminated or reduced. Many TV owners, whose sets have been doctored, report much better reception than they ever had before with the amateur station off. These TV owners have also become boosters for RCA and the best friends the Dallas amateurs have.

Although RCA was the main target in the actions described above, other manufacturers of TV sets are not without blame. Practically all other makes of TV sets are susceptible to the amateurs' fundamental in some degree. TVI, because of lack of discrimination against the amateur fundamental, has been observed on other makes at distances up to 2000 feet. Some specific examples: Admiral, 300 feet; Arvin, 100

feet; Hallicrafters, 800 feet; Philco, 300 feet; Silvertone, 1200 feet; Transvision, 150 feet; Truetone, 100 feet. The maximum distance, of course, depends upon the power of the station and many other conditions, including the particular TV set and the transmitter frequency.

It has also been found that amateur TVI exists on many sets where the owner has not recognized it. 'Phone stations coming in on the sound provide the only positive clue for many TV owners. Many relatively mild cases of amateur TVI are mixed in with and added to the other forms of interference. Most of the amateur TVI on other makes is being corrected by the owner or local dealer and as yet no serious stalemates have developed. Some reactions are passing back to these manufacturers through dealers and it is rumored that several other manufacturers are quietly looking into this type of amateur TVI in Dallas.

It is obvious that recovery from this unnecessary and uncalled-for type amateur TVI will be long and hard. Results of the determined efforts by the Dallas amateurs prove the nut can be cracked. There appears to be no reason why other amateurs either individually or collectively cannot take similar action.

Conditions undoubtedly vary throughout the country. There are places with more complicated or difficult problems. In some other locations conditions may not be so difficult. It is evident, however, that conditions and methods of solution described above are about what may be expected in near fringe areas. Fringe areas and beyond require a more thorough job along the same lines. The additional special problems which may be said to be peculiar to the situation in Dallas are given below. In these special cases, however, the fundamental or basic trouble is the same — *poor selectivity in the TV set front end.*

Poor discrimination against signals outside the TV channels in TV sets is not confined to the low-frequency side of the TV channels. Many TV front ends were found to be accepting 14-Mc. amateur signals and local 92-Mc. f.m. broadcast signals at the same time. With both signals on, the resulting difference or beat frequency was 78 Mc. which is in the Channel 5 picture and this produced plenty of TVI displaying modulation contained in both original signals. Fourteen-megacycle signals were also found to beat with the 67-Mc. video carrier of the local Channel 4 TV station. The sum of these frequencies produced a beat at 81 Mc., causing both picture and sound interference to Channel 5. In other cases 7-Mc. signals heterodyned the 71-Mc. Channel 4 sound carrier and produced a sum frequency of 78 Mc. in Channel 5. Cure for some of these troubles required use of a tuned trap to attenuate the f.m. signal in addition to a high-pass filter to reduce the amateur fundamental. There are other areas with combinations which could give similar trouble. Knowledge of the frequencies being used in each locality will often give a clue to likely combinations of signals. The frequencies may not always be limited to f.m. and TV broadcast.

Other frequencies used in other services should also be considered. These cases which may be peculiar to Dallas are recorded only for a guide or suggestion for amateurs in other areas with their peculiar problems. This is done at the risk of a misunderstanding that all Dallas amateur TVI is special and peculiar only to Dallas. The TV set front-end deficiencies are universal for all TV areas and this presents all the general problems *plus* the special problems which might be peculiar to a specific area.

Previous reference has been made to the Federal Communications Commission. A further word is in order. As much of the work as possible was carried on by the amateurs without calling on the FCC. Occasionally FCC was requested to observe and, occasionally, FCC was requested by amateurs to make tests. Undoubtedly, FCC made some tests unknown to the amateurs. In spite of work done by the amateurs, FCC was literally swamped with additional headaches in connection with TVI, part of which was this type of amateur TVI. In every instance FCC was scrupulously fair. FCC representatives at Dallas refereed the game according to the rules which was all that could be expected. The article "TV Interference Problems," written by Mr. William L. Kiser, FCC engineer in New York, and published in *Radio-Electronics* magazine, was circulated widely with material originated by the TVI Committee. On January 18, 1951, the following letter was written by the Secretary of FCC, Washington, D. C., to the Chairman of the TVI Committee:

January 18, 1951

Mr. J. F. Skelton
Chairman, TVI Committee
Dallas Amateur Radio Club
704 Interurban Building
Dallas, Texas

Dear Mr. Skelton:

The material which you furnished Mr. John H. Homsy, the Commission's Engineer in Charge, Dallas, Texas and which related to your study of the causes of television interference in your city and the remedies which must be provided, was furnished this Commission by Mr. Homsy and has been read with interest.

It is quite obvious that your committee has done a great deal of research on this subject and it appears that your findings will be of value both to the amateurs and to the television industry in general.

On the basis of the work which you have performed in this behalf and the interest which it has engendered, please accept for the Dallas Amateur Radio Club this expression of the Commission's appreciation.

Very truly yours,

T. J. SLOWIE
Secretary

What is the amateur fraternity going to do about this TV receiver problem? Are amateurs going to continue to wrangle with TV manufacturers? Good engineering practice dictates that TV sets should be correctly built in the first place. The chances are good that future models of TV sets will be no better unless sufficient pressure is applied. The thing needed most is an avalanche of opposition. This opposition should take two forms. (1) Let your opinion and experiences be known to everyone connected with the design, manufacture, sales and service of TV sets. Expose

their engineering practices at every opportunity. (2) Quickly get your transmitter TVI-proofed and keep it on the air as many hours each evening as possible and create a flood of complaints. Of the two forms, continuous operation of TVI-proofed transmitters by every amateur in every TV area is by far the most important. The resulting overwhelming number of complaints and returned sets to dealers will get results. This strikes at their pocketbook. It is obvious that a few amateurs cannot get the job done. It will require the coordinated simultaneous effort of every amateur in the game.



June 1926

Technical Editor Kruss urges amateurs to protest the threatened discontinuance of the standard frequency transmissions of WWV.

Grebe announces a new regenerative detector-one stage receiver to be known as the CR-18.

General Electric's numerous high-power short-wave experimental stations at South Schenectady are intimately described.

Copper tubing is making its appearance as tank coil material in the transmitters of leading amateur stations.

ARRL Communications Manager F. E. Handy, u1BDI, is receiving congratulations on his marriage to Miss Winifred G. Richardson, formerly of the League staff.

The first of the new "Worked All Continents" certificates has been awarded to Brandon Wentworth, u6OI.

A notable bit of DX work is the contact between Fred Elser's p3AAA, Philippine Islands, and British g5HA.

Dr. E. F. W. Alexanderson of GE reports on his work in the field of polarized transmission.

The first trans-Atlantic QSO between crystal-controlled amateur stations has been realized by u1CAK and g28Z.

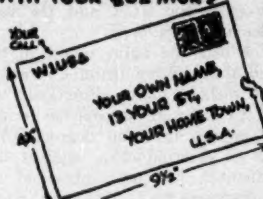
This summer's Byrd, Wilkins, and Amundsen-Ellsworth arctic expeditions are all making use of short-wave amateur radio for their contact with civilization.

Creditable "Calls Heard" reports have been turned in by C. B. Evans, u1BFT, H. A. Chinn, u1BAD, and E. W. Mayer, p4KID.

A multistage transmitter using a "thick" crystal and multiplier stages is described by John M. Wells, u1CAK-u1ZD, and E. D. Tillyer of the American Optical Co.

Typical amateur stations described this month include J. E. Hodge's u4BY, Savannah, Ga., A. H. Asmusen's c4GT, Calgary, Alta., and W. E. Slauson's u7AY, Eugene, Ore.

IS YOURS ON FILE
WITH YOUR QSL MGR?



SEE PAGE 108



Radiological Monitoring

Part II—Instrumentation: The Geiger-Muller Counter

BY STEPHEN S. FRIEDLAND,* W5PKI

IN Part I of this article (April QST) the radiations emitted during and after an A-bomb explosion were described. These were shown to be the α (alpha) particle, which is a helium nucleus, the β (beta) particle, which is a high-speed electron, and the γ (gamma) ray, which is very very high-frequency electromagnetic radiation. All these particles produce ionization when they interact with matter. The number of ions produced per cubic centimeter is a measure of the radiation level. The unit used to describe the radiation level is called the roentgen. The amount of radiation that will produce 2.08×10^9 ion pairs per cm.³ of air is called one roentgen.

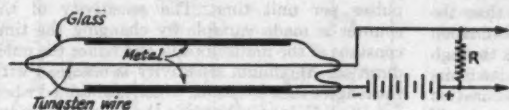


Fig. 1 — Basic circuit of the Geiger-Muller counter.

Most of the radiation emitted during and after an A-bomb blast will be due to the radioactive fission fragments produced by the bomb. The fragments will be deposited about the countryside by the winds existing at the time of the blast.

Because of the radiation effects described in Part I, it is clear that no relief forces will be allowed into an area until the radiation level has been determined and declared safe. Radiological monitoring teams are now in the process of organization in the various states. The teams will be equipped with survey instruments, radiation calculators, radio communication, etc., for their work. Since thousands of instruments are now being made for this purpose, this and the subsequent section of this article will deal with the basic principles used in the construction of two general types of survey instruments.

* Assistant Professor of Physics, The University of Connecticut, Storrs, Conn.

¹ Calculators of this type probably will be available in the near future through concerns marketing radiation-detection equipment. A small quantity of the calculators designed by Dr. William C. Orr and the author (circular slide-rule type) has been manufactured to supply civil defense agencies of the State of Connecticut. The printer's minimum-order requirements have left a limited number available, and they can be purchased at the manufacturing cost of \$1.00 each. Address the author in care of ARRL, West Hartford 7, Conn., marking "Radiation Calculator" on the outside of the envelope. — Ed.

A counter tube and typical housing. Calipers at the left shows the comparative scale.

The Radiation Calculator

Fission fragments are easily produced in the laboratory. The scientist has extensively studied their properties and is now quite familiar with their radiations and over-all effective half life. It is now possible to compute the radiation level at any given time if the radiation level at any previous time is known. Also, it is possible to compute how much radiation will be absorbed by a person in an area over a period of time, if the radiation level at any time was determined. Such calculations are indeed intricate but have been completed. A simple slide rule has been made which uses the results of these calculations and gives at a glance all of the required information.¹

Instrumentation

For the purposes of civilian defense we will be concerned with two types of instruments that will measure the level of radioactivity. One type, the ionization chamber, is most useful for high-level radiation such as exists after an A-bomb blast. Its indications are a function of the intensity of radioactivity, and it can therefore be calibrated directly in roentgens per hour. The second type, the Geiger-Muller counter, is more sensitive but its indications are proportional to



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the number of particles rather than to their radioactive effect. Therefore, it cannot be calibrated directly in roentgens per hour unless by some means only one type of particle is permitted to actuate it. Also, it is limited in the radiation level it can handle. However, its construction is relatively simple and noncritical, and it is useful for medium- to low-level radiation, for prospecting and for demonstration. It is therefore the type that will be described first.

The Geiger-Muller Counter

The Geiger-Muller counter tube consists of a fine tungsten wire mounted along the axis of a metal cylinder. The system is evacuated and then filled with a mixture of proper gases to a pressure of about 10 cm. of mercury. The basic circuit for the counter is shown in Fig. 1.

A potential difference in the range of 1000 volts is applied between the wire and metal cylinder to make the wire positive with respect to the cylinder. The potential difference is raised to a value slightly above a certain critical or threshold value but maintained less than the potential which will cause continuous ionization in the counter. Any particle that passes through the counter and produces one or more ion pairs will initiate a process of cumulative ionization between the two electrodes and a current will flow through the external resistor, R . The potential drop across R lowers the effective potential difference across the tube to a value less than the threshold value and the discharge and current through the tube rapidly stop.

The valuable characteristic of a counter tube is the large internal amplification produced by the cumulative ionization initiated by each particle that passes through the tube. The current through the counter will be as high as 10^{-5} amperes (10 microamperes). Thus, R can be made a megohm in size and conventional tubes may be used as amplifiers.

The number of pulses produced across R each second is proportional to the number of particles passing through the counter per second. The

² The author wishes to acknowledge the assistance of Vernon Chambers, W1JEQ, in the construction of the counter and in the preparation of this section of the article.

³ Transformers of the type used in this unit cannot be obtained separately, but a more compact transformer of improved design (part No. P-111190) will soon be available at an approximate list price of \$5.00. The manufacturer is the A. C. Gilbert Co., New Haven, Conn.

pulse size for each particle, even though the ionizing ability of particles may vary, will be the same. Thus, the counter is capable of detecting a single particle passing through its chamber but does not tell what kind of particle it is. Information on the nature of the radiation may be obtained by other methods. α particles cannot penetrate the walls of the counter and thus will not be detected. If a metal shield is placed around the counter it will absorb most of the β particles. Thus by elimination one can determine if γ 's or β 's are present, or both.

A Practical Geiger Counter²

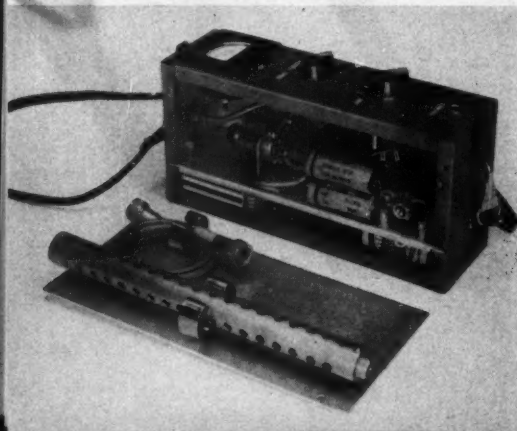
The circuit diagram of a practical counter is given in Fig. 2. The high voltage is obtained from a buzzer-transformer power supply. Output from the Geiger tube is capacity coupled to a multivibrator circuit, using a Type 3A5 tube, which triggers whenever a pulse is received from the Geiger tube. The current through the microammeter depends on the duration of the triggered pulse from the multivibrator and the number of pulses per unit time. The sensitivity of the counter is made variable by changing the time constant of the multivibrator and hence the pulse duration. Maximum sensitivity is obtained with the longest time constant, which is obtained when capacitor C_4 is switched into the circuit by means of S_1 . A potentiometer, R_2 , provides a zero adjustment for the microammeter.

The buzzer-transformer combination for the power supply uses a 1.5-volt flashlight battery for the primary source of power. A Type 1T4 is used as the rectifier tube and C_2 and R_1 are the filter capacitor and the loading resistor, respectively. Output is approximately 1000 volts with the voltage control, R_3 , set at the maximum position. The particular transformer (T_1) used was taken from an A. C. Gilbert type U-239 Geiger counter.³

A steel chassis measuring 3 by 5 by 10 inches is used as the cabinet for the counter. Some of the components are mounted directly on the steel cabinet and the remainder are supported by a flat aluminum plate which measures $2\frac{1}{8}$ by $9\frac{1}{4}$ inches. When in place, the subchassis rests on the batteries and is locked in position by $\frac{1}{2}$ -inch lengths of $\frac{1}{4}$ -inch-square dural rod, drilled and tapped so they can be clamped down on the plate by machine screws through the ends of the cabinet.

The multivibrator components other than C_4 , C_5 and C_6 , are mounted on a Vector socket; the three capacitors named are mounted on S_1 . The vibrator-transformer is supported by stand-off insulators at the right end of the chassis just to the rear of the voltage control, R_3 , R_3 , which is at high voltage to ground, is mounted

The meter, meter zero control, sensitivity switch and the 'phone jack are in line across the top of the Geiger counter. The input connector, J_1 , is at the left end of the case and the lips at either end of the case are notched to clear the aluminum subchassis. Twin-Lead and dog-leash catches form the carrying strap.



QST for

An interior view of the Geiger counter. The miniature tubes are mounted on a bracket at the left end of the subchassis. Feed-through insulators to the right of the tube bracket are connected between the 1.5-volt cells and the heater and the vibrator circuits. The batteries may be seen at the bottom of the cabinet.

on a polystyrene bracket. The three paper capacitors shown at the center of the chassis are the 0.06- μ fd. units connected in parallel to form C_2 .

Not shown in the photographs are three bronze spring clips mounted below the subchassis. One of the clips holds the B battery in place and is mounted under the retaining nuts for the tube-socket bracket. The other two clips mount on the feed-through insulators and make contact with the positive terminals of the dry cells.

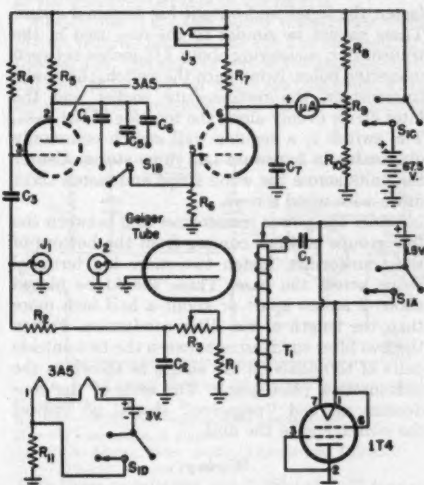
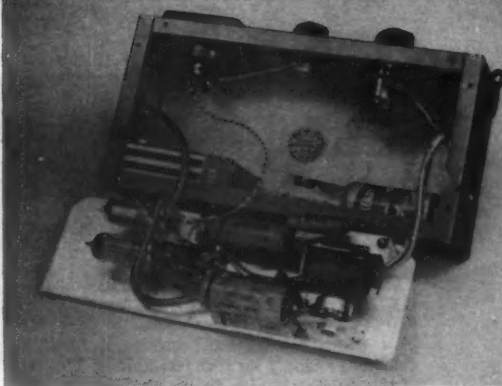


Fig. 2 — Wiring diagram of the Geiger counter.

- C_1 — 0.1- μ fd. 200-volt paper.
- C_2 — 0.18- μ fd. 1600-volt paper (three 0.06- μ fd. units connected in parallel).
- C_3 — 235- μ fd. 1000-volt (two 470- μ fd. disc ceramics in series).
- C_4 — 0.005- μ fd. mica.
- C_5 — 500- μ fd. mica.
- C_6 — 50- μ fd. mica.
- C_7 — 500- μ fd. ceramic.
- R_1 — 20 megohms, $1\frac{1}{2}$ watt; three 6.8-megohm $\frac{1}{2}$ -watt resistors in series.
- R_2 — 10 megohms, $\frac{1}{2}$ watt.
- R_3 — 5-megohm potentiometer.
- R_4 — 20 megohms, $\frac{1}{2}$ watt.
- R_5 — 18,000 ohms, $\frac{1}{2}$ watt.
- R_6 — 1 megohm, $\frac{1}{2}$ watt.
- R_7, R_8 — 10,000 ohms, $\frac{1}{2}$ watt.
- R_9 — 0.5 megohm potentiometer.
- R_{10} — 0.22 megohm, $\frac{1}{2}$ watt.
- R_{11} — 3000 ohms, $\frac{1}{2}$ watt.
- J_1, J_2 — Coaxial-cable connector.
- J_3 — Closed-circuit "phone jack.
- S_1 — 4-pole 2-section 5-position selector switch (Centralab 1414).
- T_1 — Buzzer-transformer; see text.



Shielded microphone cable is used to make connection between the 3A5 tube socket and the input jack, J_1 , and also for the cable between the counter unit and the Geiger tube. The Geiger tube is housed in a 10-inch length of $\frac{3}{8}$ -inch o.d. electrical conduit with its ends closed by metal discs. A coaxial connector is mounted on one of the discs and the leads from the Geiger tube are soldered to the connector. A series of $\frac{1}{4}$ -inch holes is drilled in the conduit so that β particles can reach the tube.⁴

Testing

The high-voltage supply can be tested with a 20,000-ohms-per-volt meter capable of measuring 1000 volts, providing that the bleeder resistor, R_1 , is disconnected. If the resistor is not disconnected, the true voltage is difficult to determine because the load is then 10 megohms (the meter resistance in parallel with R_1). The Geiger tube should not be connected to the counter during the preliminary tests. Voltage delivered by the supply should be approximately 1000 volts with R_2 at the maximum-voltage position and the output should fall to roughly 500 volts with the control turned in the opposite direction.

The Geiger tube used with this particular unit is one designed for operation at 850 volts and, as is the case with all other Geiger tubes, the maximum rating must never be exceeded. When actually calibrating the unit start out with the voltage at minimum and with the supply loaded by either the 20,000-ohms-per-volt meter or by R_1 — not both.

Before proceeding to calibrate the unit, check to see that the microammeter can be adjusted, by means of R_9 , for a zero-current reading when the multivibrator is turned on. This test is made with the high-voltage supply turned off (disconnect a lead to the vibrator dry cell) and with the heater and the plate voltages applied to the 3A5.

To check the operation of the counter, set

(Continued on page 110)

⁴Since constructing this unit, it has been learned that a new all-metal counter tube, Victoreen type 1B85, is now available. It does not require an external protective shield and is priced at \$7.50, appreciably less than the catalog prices of previously available tubes. The Radio Shack, Boston, is the distributor.

The Novice One-Tuber

Part II—Power Supply and Antenna Considerations

BY DONALD H. MIX,* WITS

A SIMPLE transmitter for the 80-meter Novice was described in Part I of this article which appeared in the May issue of *QST*. The photographs here show the construction of a suitable power supply for that transmitter. This part of the article will also discuss the problem of an antenna and information on how to tune the transmitter.

The circuit diagram of the power supply is shown in Fig. 1. The power transformer is an inexpensive unit designed for replacement in broadcast receivers. The smoothing filter consists of C_1 , L_1 and C_2 . This arrangement is known as a condenser-input filter because the first unit following the rectifier tube is a condenser. The bleeder resistor, R_1 , is a very important part. If it were not used, the filter condensers would retain a charge for some time after turning off the power switch. Then, if the indicator lamp in the transmitter happened to burn out, danger of shock would exist even after turning off the power switch. The resistor serves to discharge the condensers.

Construction

Like the transmitter itself, this power supply can be built without drilling any holes. The tools required thereby are reduced to a minimum. You will need about three feet of "1 by 2" smooth pine strip. The actual dimensions will be about $\frac{3}{4}$ by $1\frac{5}{8}$ inches. Cut two pieces 12 inches long. Lay the two pieces side by side with their wide faces down. Measure the total width of the two pieces and add $1\frac{1}{8}$ inches. This measurement is necessary because the exact width of the wood may vary slightly. Cut two more pieces of "1 by 2" to the length calculated. This will be approximately 43 $\frac{1}{2}$ inches.

* Assistant Technical Editor, *QST*.

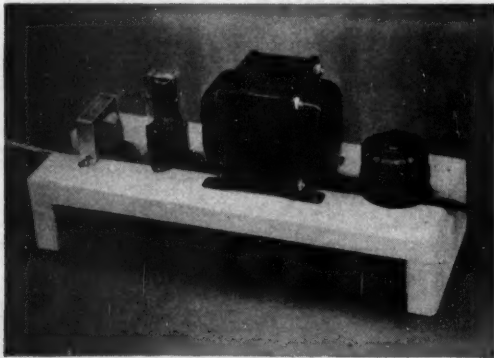
Separating the two 12-inch pieces by exactly $1\frac{1}{8}$ inches, nail one of the short crosspieces on edge under each end. Use $1\frac{1}{2}$ -inch finishing nails. Then, turning the base upside down, fasten a 1-inch angle piece under each end of each long strip. These angle pieces are similar to those used in building the transmitter, except that they are only 1 inch long on each leg. They can be purchased in hardware and dime stores. After assembly, clean up the finished base and round off the square edges and corners with sandpaper.

Underneath, across the strips near each end, fasten the input and output lug terminal strips. These should be similar to the one used in the transmitter, measuring about $1\frac{1}{2}$ inches between mounting holes. Now space the switch, the power transformer, the rectifier-tube socket and the filter choke evenly along the top side of the base. The switch is a regular wall switch commonly obtainable in hardware and dime stores. Center the units across the wood strips and fasten them down with wood screws.

Under the power transformer and between the two groups of wires coming from the bottom of the transformer, fasten two more lug terminal strips across the base. These should be placed about 2 inches apart or about a half inch more than the length of the filter condensers. Fasten the two filter condensers between the two outside pairs of terminals on the strips, as shown in the bottom-view photograph. The ends of the condensers marked "negative" should go toward the switch end of the unit.

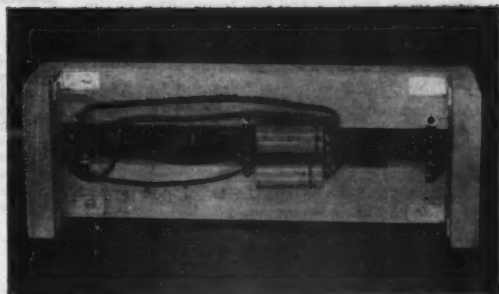
Wiring

Connecting wire used in the power supply should be of the flexible "hook-up" type. First, run a wire from one end contact of the input terminal strip to one terminal of the switch. The



A simple power supply for the Novice transmitter. From left to right, the filter choke, L_1 , the rectifier, the power transformer and the switch are spaced along the wood framework base.

Bottom view of the power supply, showing the mounting of the filter condensers, terminal strips, bleeder resistor and the wiring.



input terminal strip will be the one at the switch end of the unit. Don't solder at the terminal strip. Then, fasten one of the black leads from the power transformer (115-volt a.c. primary) to the other end contact on the input terminal strip. The second black lead from the transformer goes to the unconnected side of the switch.

Fasten one of the two yellow transformer wires (5-volt rectifier filament) to Pin 2 of the rectifier-tube socket. (Be sure to scrape the enamel coating from the yellow wires and also the green wires before making connections.) Fasten the second

Connect one of the green transformer wires (6.3-volt heater) to the upper lug on the same terminal strip. From the same point, run a wire to the uppermost contact on the output terminal strip. Solder connections at both ends of this wire. Connect the second green transformer wire to one of the intermediate contacts on the output terminal strip. The green-and-yellow transformer wire (6.3-volt heater center tap) is not used. It can be coiled up and placed where its end will not come in contact with anything.

Cables

Now place the transmitter and the power supply in the positions in which you plan to operate them. Since both units are small, they can be placed on a small operating table where the power switch can be reached easily. In this case, the power cable between the two units need not be more than a foot or two long. If, however, the power supply is to be placed under the operating table, then the distance between the two units should be measured and the power cable made longer.

The cable can be made up of lengths of flexible hook-up wire. Cut three wires to the same required length. If wires differing in color are used, it will be easier to trace them after the wire has been cabled. You can otherwise mark each end of the same wire with a distinctive tab. Run one of the wires from the "+ H.V." terminal of the transmitter to the corresponding output terminal of the power supply. If the bottom-view photograph has been followed, this will be the bottom terminal. Solder the connection at the transmitter end only. Run the second wire from the ungrounded heater terminal (6.3 volts) of the transmitter to the intermediate terminal of the power-supply output and solder both ends of this wire. The third cable wire goes from the "Ground" or "- H.V." terminal on the transmitter to the top output terminal of the power supply. Don't solder this wire at either end. Connect R_1 between the top and bottom contacts of the power-supply terminal strip and solder the connections at both ends of the resistor. After the cable wires are in place, bind them together at frequent intervals with bands of adhesive tape.

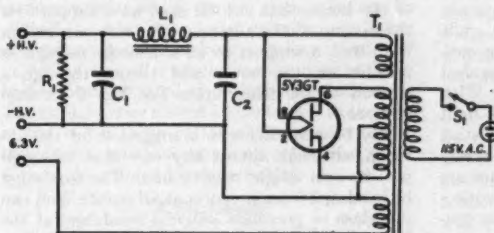


Fig. 1 — Circuit diagram of the power supply for the Novice transmitter.

- C_1, C_2 — 8- μ fd. 500-volt midget electrolytic.
- R_1 — 0.1 megohm, 2 watts.
- L_1 — 8-h. 40-ma. filter choke (Thordarson T20C52).
- S_1 — 115-volt a.c. wall switch.
- T_1 — Power transformer: 350-0-350 r.m.s., 70 ma.; 5 v., 2 amp.; 6.3 v., 2.5 amp. (Thordarson TS-24R02).

yellow wire to Pin 8 and solder. Fasten one of the two wires from the choke to Pin 2. Also run a wire from the "+" side of the filter condenser on the nearest side to Pin 2 and solder connections at this pin. Also solder the connection at the condenser. Connect the loose lead from the choke to the bottom terminal (bottom-view photograph) of the output terminal strip. Solder a wire to the "+" side of the other filter condenser and run it to the same output terminal.

Now solder one of the red transformer wires (h.v. secondary) to Pin 4 of the rectifier socket and the other red wire to Pin 6. Wire the two "negative" terminals of the filter condensers together and connect the red-and-yellow transformer wire (h.v. center tap) to the lower contact of the terminal strip at the "negative" ends of the condensers and solder connections at this point.

Now place the key and the transmitter in the positions in which they will be operated. Run wires of equal length from each key terminal to the transmitter. The wire connecting to the frame of the key should go to the "Ground" terminal on the transmitter. The connection at the transmitter can now be soldered. The other key wire goes to the transmitter "Key" terminal where it is soldered.

Connect the a.c. cord to the two input terminals to which other connections have already been made and solder these connections. The other end of the power cord is terminated with a plug to fit your a.c. outlet.

Testing

You are now ready to test the installation. Plug the power plug into a wall outlet. Turn the power switch on. *Make it a habit never to touch any part of the transmitter or power supply, except the insulated controls, until the power switch has been turned off.* Although both transmitter and power supply are designed so that the dangerous parts are not readily accessible, every caution should always be practiced in handling electrical equipment of any kind. When the power switch is turned on, the filament of the rectifier tube should light up immediately. After a minute or two, the 6AG7 should feel warm to the touch. (You can turn the power off momentarily while making this check.) Turn the two tuning condensers so that their rotor plates are fully meshed with the stators (maximum capacitance). With the key pressed, the indicator lamp should light up to approximately normal brilliance. Now start turning the input condenser C_3 to the right slowly while you watch the lamp. When the plates are half out or more, the lamp should dim noticeably. It should become bright again as you continue to turn the output condenser in the same direction. The center of the point where the lamp is dimmest is called *resonance*.

Antenna

It is now time to consider what you are going to use for an antenna. A full-size antenna is a wire that measures about 125 feet from the transmitter to the far end. As much of this length as possible should be run horizontally as high above the ground as possible. Where space is restricted, shorter lengths down to 50 or 60 feet should work well. The transmitter will feed power into a wire as short as 5 feet, but naturally, the

POWER SUPPLY PARTS LIST

Transformer.....	\$4.41
Choke.....	1.41
Octal tube socket (Amphenol 77MIP8).....	.08
Switch.....	.30
4 terminal strips.....	.20
Filter condensers.....	1.52
Rectifier tube.....	.70
4 angle pieces.....	.10
2-watt resistor.....	.20
Wood, wire, cord, power plug, etc.....	1.00

Total..... \$9.98

Accessories

Key.....	\$1.03
Antenna wire & insulators.....	2.00

Total..... \$3.03

Totals

Transmitter.....	\$15.84
Power supply.....	9.92
Accessories.....	3.03

Total..... \$28.79

transmitting range will be restricted with an antenna as short as this.

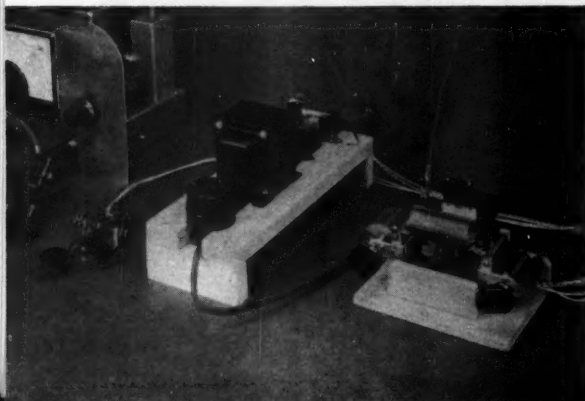
Often there will be a tree or garage to the rear of the house that can be used as a support for the far end of the antenna. The wire can be run from such a support to an anchorage as high as possible on the house and thence through a window to the transmitter. See Fig. 2 for suggestions.

No. 14 enameled wire is suggested for the antenna, although almost any wire that will support its own weight may be used. The wire must be insulated from supports at all points. You can use glass or porcelain antenna insulators at the far end and at the point where it is attached to the house. It is preferable to have the antenna consist of a single piece of wire, but it can be made of shorter lengths soldered together if necessary. Keep the lead-in part of the wire clear of the building or other objects. In bringing the wire in through the window, it can be passed in over the top of the upper sash, or under the lower sash. When the window is closed, the lead-in will be held in place. Slip a length of spaghetti over the wire where it contacts the window frame. Make the wire on the inside just long enough to reach to the transmitter output terminal. This terminal is the top rear stator nut of the output condenser, C_6 . Aside from this connection, keep the antenna wire away from the transmitter and power supply. It is advisable to run the wire vertically away from the transmitter for at least a foot or two.

If an outside wire is impossible, you

The complete Novice transmitter installation set up for operation.

QST for



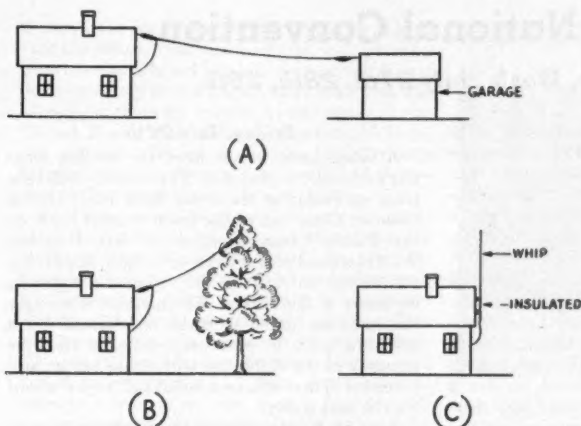


Fig. 2 — Antenna suggestions. (A) — Garage used as a support for a horizontal antenna. A mast against the rear of the garage could be used to increase the height at that end. (B) — A semi-vertical antenna, using a convenient tree as a support. This can be put up by throwing a line with weight attached over the top of the tree. The antenna should not be pulled too tight to allow for wind. (C) — A vertical whip attached at a high point on the house. The whip and lead-in wire should be insulated from the house.

can run a wire through two or three rooms, near the ceiling, or even around three sides of the molding in the operating room.

In case of a long wire outside, it is advisable to provide for grounding it during the thunder-storm season. This can consist simply of an arrangement by which the end of the wire can be clipped to a near-by radiator or water pipe when not in use. A more elaborate system would involve the use of a porcelain-base double-throw knife switch mounted on or near the window sill. The antenna wire should be connected to the arm of the switch. One of the contacts goes to the transmitter antenna terminal, while the other goes to the water pipe or radiator.

Adjustment

With the antenna connected, set the two condensers at maximum as before. Slowly rotate the input condenser (C_3) to the point where the lamp is at its dimmest point. With the antenna connected, the lamp probably will not dim as much as it does without the antenna. Now reduce the capacitance of the output condenser (C_4) until the lamp begins to brighten. Then readjust the input condenser to the dimmest point. Go back and reduce the output condenser a bit more until you can notice the light brighten a little. Then again readjust the input condenser to the dimmest point. As you repeat this process, you will notice that the lamp grows brighter at its dimmest point. This indicates that the antenna is taking power. The proper adjustment is one where the dimming of the lamp is just noticeable as the input condenser is tuned. Set the input condenser as exactly as possible at this point.

In general, the longer the antenna wire, the less critical the condenser adjustment becomes. This applies particularly to the output condenser. For any wire longer than 40 or 50 feet, the output condenser usually will be set near minimum. With short wires, the setting of the output condenser especially will be quite critical and very slight adjustments will make considerable difference in how bright the lamp gets at resonance.

Operation

You are now ready to go on the air. During the daylight hours, you may find relatively few stations on the air to work, and the range of the transmitter will be limited. But the contacts you do make will not be broken up so often by interference from other stations working near the same frequency as yours. After darkness sets in, you will hear many more stations on the air and your transmitting range will increase, but you may find more frequently that conversation with another station is more difficult because of the interference from other stations. In the daytime you will find it easier to work stations whose frequencies are farther from your own. At night, when numerous stations are on the air, most operators will listen quite close to their own frequencies and therefore you may have more luck working those close to your own frequency.

In brief trials on the air at West Hartford, we have had contacts with stations as far away as Wisconsin and Florida at night and Maine and central Pennsylvania during the day. So even though the power is low, the little rig does get out.

Transmitter and Power Supply Measurements

Power Supply

Output voltage at minimum load, key open — 415
Output voltage at full transmitter load — 355

Transmitter

Antenna disconnected, key open — lamp-drain only — 27 ma.
Antenna disconnected, tuned to resonance, key closed — total current 40 ma.
— plate and screen currents 13 ma.
— plate current 6 ma.
Antenna connected, loaded to maximum, tuned to resonance — total current 63 ma.
— plate and screen currents 40 ma.
— plate current 32 ma.
— screen current 8 ma.
— screen voltage 180
— plate watts input 11.4

ARRL National Convention

Seattle, Wash., July 27th, 28th, 29th

THE first ARRL National Convention to be staged west of the Mississippi River promises to be a spectacular affair in more ways than one. Seattle, the scene of the sixth national conclave, will be celebrating its Centennial Year in full swing during the convention dates, July 27th, 28th, and 29th.

With its half million population, Seattle is ideally situated to provide a delightful vacation. The city is bordered on one side by Lake Washington, across which is built the largest floating pontoon bridge in the world. To the west, Seattle is bounded by beautiful Puget Sound, an arm of the Pacific Ocean. All around, within easy driving distance, are picturesque mountain ranges — lofty Mt. Rainier is to the southeast. The weather in July is wonderfully pleasant due to the soft breezes that come in from the ocean to the west. Seattle never has extremes in temperature — it has never been zero nor has it ever been up to 100 degrees. And the particular dates selected for the convention, the last week end in July, are noted for the absence of rain or overcast skies according to the annals of the local weather bureau.

The National Convention is sponsored jointly by the West Seattle Amateur Radio Club and the North Seattle Amateur Radio Club. The convention committee is made up of members from these two clubs, who have been hard at work on preparations for more than a year, and they have pledged their efforts to a fine nonprofit meeting of amateurs, guaranteed to take care of every reasonable wish of every delegate. All surplus funds will be diverted back into the convention in the form of either additional food and refreshments or more prizes.

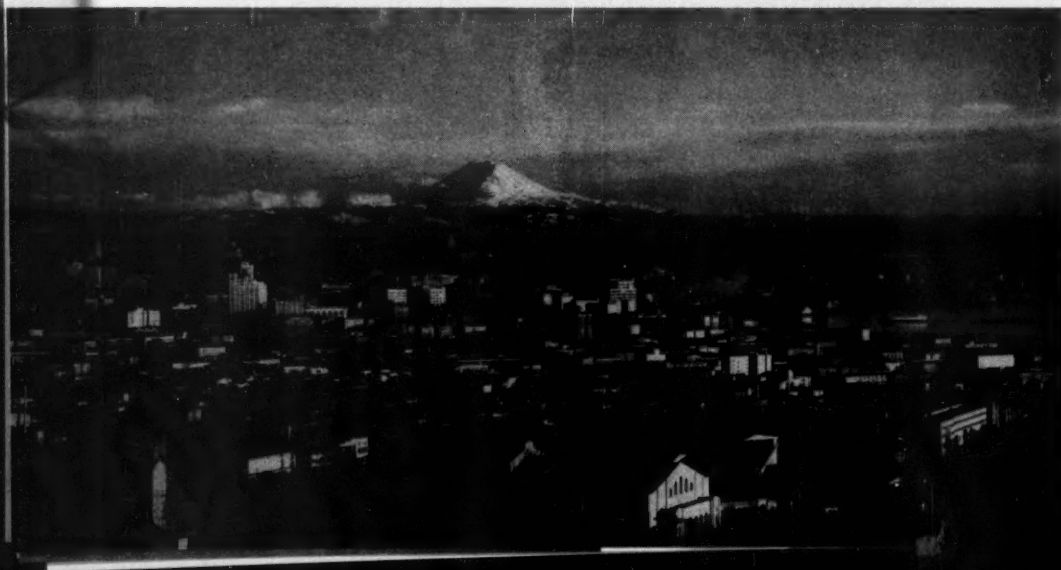
Friday, July 27th

A tournament is scheduled for visiting amateurs who like to play golf. This activity will take place on Friday at the scenic Sand Point Golf & Country Club, one of the finest private clubs on the Pacific Coast. Headed by Art Peterson, W7NL, a good player in his own right, the Friday golf doings bid to be a very pleasant beginning for many of the visitors. All amateurs who enjoy the sport are urged to make reservations for a golf date prior to convention time, so that the capacity of the clubhouse will not be too greatly exceeded. There will be a beautiful trophy award for the best golfer.

Also on Friday, registrations will be open at 10 A.M., at the convention hotel headquarters in the Olympic Hotel. The Olympic is Seattle's largest and finest hotel. However, due to the heavy tourist season during July, the committee has made reservations for accommodations in a total of 18 Seattle hotels, to insure taking care of all comers. Needless to say, visitors desiring hotel reservations should send them in immediately, in care of the General Chairman, who will route them through the reservations committee for proper handling. This is a tremendous job, and your help is requested in making hotel reservations just as soon as possible.

The opening day will include a number of radio-conducted tours to points of interest in and about the city—to such places as the Government Canal Locks which connect Lake Washington with Puget Sound. Excursions will be made to the beautiful University of Washington campus and to the Seattle Art Museum. There will be trips to several of Seattle's skyscraper buildings, for a view of the entire city from vantage points hun-

At sunset, mighty Mt. Rainier, 104 miles away, affords a striking backdrop to the modern skyline of the National Convention city. (Photo by Roger Dudley, Seattle)



dreds of feet above the ground. You'll be able to visit the colorful Seattle waterfront, with its many wharves and seafood establishments; and if you desire you may send home a frozen freshly-caught salmon, shipped by express to any point in the United States with delivery guaranteed! Here, too, you will visit the quaint Ye Old Curiosity Shoppe, with its thousands of curios and souvenirs of the Great Northwest and Alaska.

On Friday it is also planned to conduct a tour of the cyclotron in operation at the University of Washington. Numerous Seattle amateur stations will be open for inspection and visits, and for the evening hours a number of supervised dinners and receptions are being planned. You will have a choice of menus which will include Chinese, Italian, Mexican, Swedish, Russian, and varied seafood dishes . . . take your choice of whichever you crave the most! The Swedish smorgasboards are outstanding, being designed for big people with big appetites. Cocktails are served in many of Seattle's restaurants.

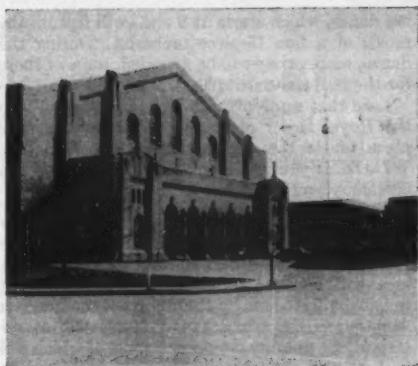
During Friday, the Seattle office of the FCC will conduct amateur examinations. Visitors who wish to take the tests for an amateur license will be provided free transportation between the hotel area and the FCC office. The youngest applicant to pass the amateur exam will receive a special award later in the convention program. It is hoped there will be an official delegation from the Washington office of FCC.

Saturday, July 28th

The first of the large meetings, to be attended by all those who are present at the convention, will be the official welcoming ceremonies Saturday morning, which will take place at the Civic Auditorium, 3rd Avenue North and Mercer Street. The Civic Auditorium has over 50,000 square feet of floor space and a stage ninety feet wide. It is here that the commercial and educational radio exhibits will be located. Doors will open at 9 A.M.

Welcoming ceremonies will include various civic officials and guests of honor, with suitable replies by ARRL President George W. Bailey, W2KH, and other official representatives. There will be a colorful Canada-America Friendship Ceremony, with the spotlight on the VE gang, and a bit of entertainment by Scottish bagpipers.

In the afternoon there will be several large meetings for amateurs, but the YLs and the XYLs will have an opportunity to go on a delightful salt-water cruise, lasting several hours, with a meal served aboard the cruise vessel. The ship will be equipped with a phonograph player and two-way radio, and a number of YL prizes will be awarded as it travels amidst beautiful islands across Elliot Bay. Meanwhile, the OMs will get down to business with the official ARRL meeting. Northwestern Division Director Rex Roberts, W7CPY, will sound the keynote for the opening of the session. Present from ARRL headquarters will be Messrs. Bailey, Handy, Goodman and Budlong. The latter will be present only if he has not had to leave for the Extraor-



Seattle's Civic Auditorium where many major National Convention activities will take place.

dinary Administrative Radio Conference in Europe, in which event Huntoon will substitute. Following this, a brief intermission for refreshments and light entertainment, and then back to the Civil Defense forum, with many key government and military officials taking part. The Civil Defense forum will be managed by Gene Dodge, W7BTV, president of the Puget Sound Council of Amateur Radio Clubs. Emergency amateur communications will be the key topic, and the latest developments both in techniques and regulations will be brought forth. A Coast Guard mobile unit will be on display and in actual operation, fully manned by CG personnel, and on stand-by in case needed for some possible rescue operation anywhere in the western part of the state. The 13th Naval District will also have a highly interesting communication display.

Following the Civil Defense forum, and after a brief intermission for refreshments, there will be staged a National Code Championship competition, with loving cup awards for the fastest operator, both typewriter and hand-copy divisions. Equipment for this activity has been made available by the Alaska Communication System, one of the great traffic systems of the world.

At 6 P.M. Saturday there will be a half-hour show broadcast from the stage of the Civic Auditorium over KOMO. This show is a two-time first award winner for the best Seattle broadcast show, and will prove highly entertaining as you watch it being performed just a few feet away!

On display at the Auditorium will be numerous unique and interesting radio items, such as an amateur television station in actual operation, a radio-controlled lawnmower which cuts your lawn while you leisurely sit on the porch, radio-controlled model yachts, and many other similar gimmicks.

All evening dinners recommended to convention guests will be supervised, with local amateurs doing the directing. Again you will have a wide variety of good food and refreshments.

There will be a resumption of light-entertainment acts and prize awards at the Civic Auditorium in the evening, preceding the dance. The

big dance, which starts at 9 p.m., will feature the music of a fine 15-piece orchestra. During the dance, more prizes will be awarded, some of them for the best dance couples.

Late that same night, a mystic initiation into the Royal Order of the Wouff Hong will take place under the supervision of Castle Arpke, W7LOZ. If you've never been initiated, this is a ceremony you will never forget!

Sunday, July 29th

Mobile activities and smaller technical meetings will be held on Sunday. Mobile contest judging will be done by the officers of the Tacoma Amateur Radio Club. This activity will follow the various Sunday breakfasts, most of which will be held near the Olympic Hotel area. Be sure to bring your mobiles! Special technical help and lots of spare parts will be on hand in case of difficulty.

Special chartered busses will be in operation during both Saturday and Sunday between the hotel area and the Civic Auditorium. Sunday, too, guests will have an opportunity to see some of the world's fastest speedboats in action as they complete trial runs on Lake Washington for the Gold Cup Speedboat Races, which will take place two days after the convention. Seattle's own record-holder, the *Slo-Mo-Shun*, does over 160 m.p.h., and on the crew taking care of its giant engines is Joe Schobert, W7CGL.

A swimming party will be available to those who enjoy this sport, and Seattle's ten public beaches, plus many private and semiprivate beaches, will be a great attraction. United Airlines has arranged for a special flight of 50 amateurs over the city and on toward Mt. Rainier, 100 miles away, swinging around toward Victoria and return.

Sunday's afternoon technical sessions will include talks by Byron Goodman, W1DX, on "Colossal Modulation"; John L. Reinartz, K6BJ, on "Methods Amateurs Can Use To Combat TVI"; Don Merten, W2UOL, on "Filters"; and by others on v.h.f., amateur TV, etc. These meetings will all be in the Olympic Hotel.

Following the afternoon sessions, the major and final part of the convention will be the banquet at 6 p.m. at the Civic Auditorium. An excellent menu is being planned, with light entertainment. After the close of the convention, perhaps around 9 p.m., there will be a reunion of the delegates who plan to remain over the following week. The Seattle Centennial civic celebrations will take place within two days after the convention, and those desiring to remain will be offered additional courtesies by the Seattle gang.

For the Ladies . . .

YLs and XYLs will have numerous activities all their own, with Mrs. Toddy Nye, W7LCS, presenting a YL award sponsored by the West Seattle Amateur Radio Club. Mrs. Monica Zandbergen (XYL of W7KZP) will present a surprise entertainment program for the ladies.

Registrations

Preregistration for the entire convention program is \$7.50. After July 1st the rate will be \$8.50. Those desiring separate banquet tickets may secure same for \$3.50 each.

All funds and correspondence should be sent to John Gruble, W7RT, General Chairman, 1921 Atlantic Street, Seattle 44, Wash.

Last, but not least, each registered delegate will receive a handsome program booklet containing interesting photographs and data about Seattle and the Northwest which will make it a valuable keepsake.

See you all in Seattle — July 27th, 28th, and 29th!

— W7RT

Strays

William J. Halligan, sr., founder and president of the Hallicrafters Co., and a licensed amateur of long standing, has been elected national president of the Armed Forces Communications Assn., a society pledged to scientific and industrial preparedness in signal communications, electronics, and photography as an essential aid to military defense.

WWV-WWVH SCHEDULES

For the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WWVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, indicating warning, unstable conditions, or normal.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier is modulated by a seconds pulse which is heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

Wright vs. Vogt

Supreme Court of New Jersey Okays 60-Foot Amateur Tower Despite 35-Foot Restrictions in Zoning Ordinance

IN early April the Supreme Court of the State of New Jersey, by a vote of five to one, agreed with the American Radio Relay League's contentions that amateur radio operation constitutes an accessory use of residential property and that a height restriction imposed by zoning ordinance was not applicable to an amateur antenna tower.

This case, *Wright vs. Vogt*, is one which the League, through the office of its General Counsel, has been actively prosecuting for nearly two years.

While the League cannot undertake to intervene in every legal problem concerning the amateur operations of its members, it does keep close watch on such instances as are brought to its attention; in the event that the initial trend of a particular case is toward a decision which might end up as setting a legal precedent against the rights of all amateurs, the League may intervene.

It did just that in the *Wright* case. In mid-1949, Frederick W. Wright, jr., W2UWK, began construction of a 60-foot triangular steel tower to support a beam in the rear of his home in Haworth, N. J. Neighbors objected and contacted local municipal authorities of the Borough of Haworth, who instructed Wright to cease work and apply for a permit for its construction. This was done. As W2UWK is a graduate mechanical engineer, the application was thorough and complete. The Borough then denied the permit because of the height restriction in its zoning ordinance providing that no structure could be erected more than 35 feet high, and that an amateur transmitting station was not a use of residential property envisaged under the ordinance. On an informal suggestion from the Borough attorney, Wright appealed to the Zoning Board of Adjustment to grant an exception. This the Zoning Board refused to do, despite a recommendation from its attorney that the variance be granted. At this point the General Counsel of ARRL, who had been watching the case closely, decided that since the issues were clear-cut and the zoning ordinance involved was typical of zoning ordinances in effect throughout the country, it would be an appropriate case to litigate.

The questions were basic: Is the hobby of amateur radio a customary and incidental use of residential property, and is a restriction imposed upon the height of an amateur's tower, in the absence of the question of safety, valid?

A near-by attorney, Herbert Black, W2AKW, was retained by Wright to handle local details. The preparation and printing of briefs, conduct of trials and other major legal aspects were handled by the League's General Counsel in Wright's behalf. Suit was entered against Sig-

fried Vogt, the Borough building inspector, and the Borough itself, seeking reversal of the decision of the Zoning Board of Adjustment. A pre-trial conference was held in February, 1950. On March 10th the trial itself was held. After about two hours of testimony by both sides, the judge requested that each party submit briefs. A detailed brief was submitted by the League in Wright's behalf, written by Quayle B. Smith, W3KDR, of the ARRL General Counsel's office.

This effort resulted in success. Judge Russell Waesche, who at the trial showed a particularly keen perception of zoning problems with all their complicated background, in August issued a decision reversing the action of the Borough and directing it to grant Wright the requested permission! Surprisingly enough, this decision in the amateur's favor was in one way a disappointment; it had been the League's thought that if an unfavorable decision were forthcoming the matter could be carried to a higher court and settled there in our favor (we would hope), making it a correspondingly more useful precedent. Fortunately, the Borough itself appealed.

The argument before the Appellate Division was scheduled for early March, 1951. After arriving in Trenton, the League's attorneys were informed that the Chief Justice had pre-empted the case for consideration by the full membership of the Supreme Court of the State of New Jersey, in the feeling that it was one of wide interest and considerable importance! The case was argued accordingly. A month later, the Court issued its precedent-setting decision.

In view of the tendency of local communities, in recent years, to make their zoning ordinances more stringent, the outcome of this case is a considerable step forward in the League's fight to get thoroughly established as law the principle that the operation of an amateur radio station is indeed a customary and incidental use of residential property, and that zoning ordinances hindering such operation are invalid.

The League currently has a second case under litigation. George Lord, W3MKK, Munhall, Pa., a year or so ago ran into difficulties similar to Wright's and, again finding the issues clear-cut, General Counsel Segal intervened. The lower court ruled in the amateur's favor, but upon appeal by the Borough, a higher court ruled against Lord. The League's Counsel filed an appeal to the Supreme Court, which has consented to hear the case, and argument is scheduled for the week of May 21st. We hope that a subsequent issue of *QST* will carry good news similar to that in *Wright vs. Vogt*.

— J. H.

Happenings of the Month

LICENSE MATTERS

You will recall from the editorial in April *QST* that the League had requested reargument of the proposed Amateur Extra Class license. This request the Commission has now denied, on the basis that no new reasons were forthcoming. (Commissioners Hennock and Sterling voted to grant our request, but were in the minority.) It appears, therefore, that there will be an Amateur Extra Class license available the first of next year, and that after January 1, 1953, amateurs who want unlimited 'phone privileges (and who do not already possess an Advanced Class license) will have to go after the new ticket, with its 20-w.p.m. code test and advanced technical examination.

By the way, let's get the new nomenclature for amateur licenses straightened out. Some of the old Class A gang are worried that since many of them have "Class A" licenses which will not expire until after December 31, 1952 (the date after which no new Advanced tickets will be issued), they won't be able to get Advanced privileges. The answer is that they have Advanced Class licenses now. There is no longer any such thing as Class A. It is now Advanced Class. Surely, your ticket may say "Class A," but only because it's much too expensive and complicated for the Commission to call in all the tickets outstanding and reissue them under the new name. So far as you are concerned, if you hold a "Class A" license you are an Advanced Class operator *right now*. So you will eventually be applying for a renewal of your license, not a new one.

The Commission says it is getting quite a few inquiries from renewing hams as to whether they may continue to operate while their tickets are in the mail to Washington, or being processed there for renewal. They sure can. If you send in your ticket for renewal, or along with examination papers and application for a higher-grade license, you may continue to operate without the

license in your possession until the Commission sends you the renewed or modified one (but in no event beyond the expiration date of the license or with privileges other than authorized by the original ticket). If you apply for modification due to change of address, you may operate at the new location without a ticket in your possession not more than four months nor beyond the expiration date, provided you send monthly notification of the circumstances to the FCC Engineer-in-Charge of your district (see list in connection with the Novice feature story in this issue). Of course, you must use portable calling procedure. By the way, if you change your address just a few months before your license is due to expire, it's a good idea to wait until about 120 days prior to expiration and then apply simultaneously for modification and renewal of your license. In the past, modification resulted in an extension of the license term for an additional five years, but this is no longer true. As a matter of fact, if you are taking an exam for a higher grade of license (say, from General to Advanced) also shortly before the license held is due to expire, again apply also for renewal. Remember that renewal applications must now contain the affirmation, in the space provided on the form, that your log shows the required operating activity, and that you can send and receive code at the rate of speed required for an original of the license being renewed.

In February, through a mix-up with the Government Printing Office, the FCC amateur licensing section ran out of license forms — and later exhausted their supply of window envelopes in which to mail them — so that issuance of licenses was held up for some weeks. This situation has now been cleared up, but this will explain any unusual delay you may have experienced if you were dealing with FCC on license matters the early part of this year. This year is a big one for renewals, however, and the delay in processing amateur applications may run greater than in previous years.

Amateur radio was featured on the screens of more than five million TV sets in April when the Faye Emerson Show presented an interview with Martin Block, W2MGE, disc jockey of radio and movie fame, and Marx S. Kaufman, W3IUC, Baltimore advertising executive who originated the show, with an actual demonstration of a New York City mobile communications net in operation. In this picture, W2MGE, left, and W3IUC look on as Miss Emerson radios her thanks to the net members for their demonstration. The 15-minute show, carried by 47 TV stations, was an excellent example of top-notch publicity for amateur radio.



QST for

AMATEURS ASKED TO COOPERATE TO MAKE FREQUENCIES AVAILABLE FOR MILITARY MANEUVERS

The Federal Communications Commission has been advised by the United States Army of large-scale military maneuvers to be staged in North and South Carolina from August 6, 1951, to September 7, 1951. Because of the size and nature of these maneuvers, the use of the frequency band 3700-3900 kc. will be required in addition to frequencies outside this amateur band to be made available temporarily for military use.

The problem is essentially one of interference from amateur operation to low-power military training operations in the southeast portion of the United States. Therefore, on behalf of the Army and with the concurrence of the American Radio Relay League, the Commission requests the voluntary cooperation of radio amateurs within interference range of the maneuver area to observe the conditions set forth below.

1. *For amateurs in North Carolina, South Carolina, Georgia, Delaware, Maryland, Virginia, West Virginia and the District of Columbia, and in Tennessee east of and including Hamilton, Rhea, Roane, Anderson and Campbell counties: No operation in the band of frequencies 3700-3900 kc during the period of the maneuvers.*
2. *For amateurs outside the area defined in (1) above and east of the Mississippi River:*
 - (a) *No special limitations during daylight hours*
 - (b) *No night time operation (local sunset to local sunrise) in the band of frequencies 3700-3900 kc during the period of the maneuvers.*
3. *For amateurs west of the Mississippi River or outside the Continental United States: no special limitations.*

The Commission and the United States Army officials are of the opinion that careful observance of the limitations proposed herein will permit essential radiocommunication in connection with the maneuvers to be conducted with a minimum of harmful interference. Since the military operations will be conducted with low power, the absence of any signal should not be construed as an indication that maneuver operations are not in progress.

The Commission wishes to emphasize that this public notice is a request for the cooperation of the radio amateurs and an opportunity to further enhance the excellent reputation for co-operation which that group already enjoys.

MORE LICENSE PLATES

Bills permitting call letter license plates have passed the legislatures of Minnesota, New Jersey and Wisconsin. The governors of the latter two have not signed the bills at this writing but it is expected they will shortly.

Diligent work for more than a year on the part of New Jersey amateurs enabled them to gain the plates over the original opposition of the motor vehicle department. The Northern New Jersey Radio Association and the Ocean County Radio Association, supported by other club groups in the state, combined forces in contacting state legislators and officials, a good deal of the work being concentrated among a special committee which included W2s ZBY MM MMG IQJ and MUP, assisted by VQR and YAO. Hudson Division Director Johnston, W2SOX, and both New Jersey SCMs, W2s ASG and NKD, participated in this work also. A well-organized plan of contacting state officials and legislators was carried out so well that legislators, upon hearing their 'phone ring, developed the stock phrase, "Yes, that amateur bill is a good bill and I will vote for it." Unanimous passage of this bill was aided by the fact that New Jersey amateurs have

a well-established position in the state civil defense organization.

Amateurs in Wisconsin put forth a great deal of work and effort to secure passage of their bill. The Marinette and Menominee Radio Club, through its Secretary, W9JXY, kept amateurs in the state informed of legislative activity, urging them to write their senators and assemblymen in support of the bill. Through W9PFF, in the state capitol, information was disseminated via the Badger Emergency Net, while members of the Milwaukee Radio Amateurs' Club were able to lend their support through President W9ONY and W9s GPI, former Central Division director, and IZO. The latter two were instrumental in securing the support of powerful industry groups in the state capitol, a factor which aided materially in the passage of the bill.

As reported last month, Nevada also secured passage of the call letter license plate bill. Led by W7OXX and W7CTK, the project was started by amateurs in the Las Vegas-Boulder City area who had Assemblyman Fran Buol, a man with the reputation of having every bill he introduced become law, sponsor the license plate legislation.

(Continued on page 118)

How To Pass the Novice Examination*

*Example Questions and Answers for the New Novice License
Available July 1st*

SAY, you would-be hams — got your sights set on the new Novice Class license? Good! Here's the dope on how to get it.

FCC has indicated that its field offices will be equipped to conduct Novice (and Technician — see box) examinations effective July 1st. Don't show up that morning at an FCC office, however, because it's a Sunday. But Monday morning FCC should be ready for business.

Any citizen of the United States is eligible to apply for the Novice license, except former holders of any class of amateur license (including DL and JA licenses, incidentally, issued by the U. S. military). The requirements are passing of a test in sending and receiving code at the rate of five words per minute, and a new simplified written examination. Exams may be taken at any of the regular FCC examining points. They may also be taken by mail under the usual conditions for old Class C (now Conditional Class) — i.e., eligible for examination by mail are applicants more than 125 miles airline from a point at which FCC conducts exams four times yearly or oftener; physically disabled persons unable to travel; and persons in the military service unable to appear for the examination.

The procedure? If you will appear for personal examination, write or visit the FCC Engineer-in-Charge of the district in which you live (for address, see the adjoining page) asking for a

* This information is a condensation of the material which appears in the revised and expanded twenty-seventh edition of *The Radio Amateur's License Manual* (50¢), being published by the ARRL.

¹ See page 23, January *QST*, which carries the examination schedule for the first half of 1951. The schedule for the second half of this year will appear in the July issue.

TECHNICIAN LICENSES

Technician Class licenses also become available after July 1st. In addition to the 5-w.p.m. code test, the applicant must pass the standard General Class (old Class B) written examination in regulations and theory. This study material is in *The Radio Amateur's License Manual*. The discussion herein on the procedure to be followed in applying for licenses, in person or by mail, applies also to Technician aspirants. As a matter of fact, one can apply for both Novice and Technician privileges simultaneously, taking the 5-w.p.m. code test and two written exams. It should be noted that the Technician Class license is a regular five-year ticket renewable upon showing of operating activity.

Form 610 (application for amateur operator and/or station license) and information on the exact date when exams will be held in the city at which you wish to appear.¹ Fill out the form and mail it back to the Engineer's office, and then appear at a specified time for personal examination. Or, if you are appearing at a district office where there are frequent examinations, simply fill out the form and take it with you. First the Engineer gives you your code test in receiving. The procedure is that you are required to copy "solid" for at least one minute out of about five minutes of test material. When that's done, you get the sending test, on the same basis. When you have passed both sending and receiving code tests, the Engineer gives you your written exam. Exams are now graded right in the field offices so you may learn immediately whether you passed. In any event, all papers go to Washington for issuance of licenses, which requires several weeks. If you fail, you have the privilege of taking the exam again after thirty days (any number of times if necessary).

If you are eligible for an examination by mail under the conditions specified above, here's what you do: Write your Engineer, asking him to send you the papers for a Novice Class license examination by mail. (If physically disabled, include a physician's certificate; if in the military service, include a certificate of the commanding officer attesting your inability to appear.) You will receive an application form and a sealed envelope containing a set of examination questions, as well as specific instructions on how to proceed. Before doing anything else, *read the instructions carefully*. You have to have yourself examined in code speed by some licensed operator with whom you have made an arrangement to that effect. He must be an Advanced or General Class (old A and B classes) licensee, or must have held within five years a license as a commercial radiotelegraph operator, or must have been employed within five years as a radiotelegraph operator in the service of the U. S. You also have to provide a witness who will open the envelope of questions and certify that you wrote out the answers without assistance. This may be the same person who gives you your code test, or someone else, but that person must be at least 21 years of age.

Now, what and how to study?

As for code, we can't go into detail here. Get yourself a copy of *Learning the Radiotelegraph Code* from ARRL (25¢). Or use the material in the *Handbook* or *How To Become a Radio Amateur*. Or get another ham to help you; also, if there is a local radio club, check to see if code classes are being conducted. Or use all methods!

UNITED STATES RADIO DISTRICTS

Address the District FCC Engineer-in-Charge

District No. 1, 1600 Customhouse, Boston 9, Mass. The states of CONNECTICUT, MAINE, MASSACHUSETTS, NEW HAMPSHIRE, RHODE ISLAND and VERMONT.

District No. 2, 748 Federal Bldg., 641 Washington St., New York 14, N. Y. In the state of NEW YORK, the counties of Albany, Bronx, Columbia, Delaware, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Schenectady, Suffolk, Sullivan, Ulster and Westchester; in the state of NEW JERSEY, the counties of Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren.

District No. 3, 1005 Customhouse, Second and Chestnut Sts., Philadelphia 6, Pa. In the state of PENNSYLVANIA, the counties of Adams, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Perry, Philadelphia, Schuylkill and York; in the state of NEW JERSEY, the counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean and Salem; and the county of Newcastle in the state of DELAWARE.

District No. 4, 508 Old Town Bank Bldg., Baltimore 2, Md. The state of MARYLAND; the DISTRICT OF COLUMBIA; in the state of VIRGINIA, the counties of Arlington, Clark, Fairfax, Fauquier, Frederick, Loudoun, Page, Prince William, Rappahannock, Shenandoah and Warren; the counties of Kent and Sussex in the state of DELAWARE; in the state of WEST VIRGINIA, the counties of Barbour, Berkeley, Grant, Hampshire, Hardy, Harrison, Jefferson, Lewis, Marion, Mineral, Monongalia, Morgan, Pendleton, Preston, Randolph, Taylor, Tucker and Upshur.

District No. 5, 402 Federal Bldg., Norfolk, Va. The state of VIRGINIA except that part lying in District 4, and the state of NORTH CAROLINA except that part lying in District 6.

District No. 6, 411 Federal Annex, Atlanta 3, Ga. The states of GEORGIA, SOUTH CAROLINA and TENNESSEE; the state of ALABAMA except that part lying in District 8; in the state of NORTH CAROLINA, the counties of Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Cleveland, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga and Yancey.

District No. 7, 312 Federal Bldg., Miami 1, Fla. The state of FLORIDA except that part lying in District 8.

District No. 8, 400 Audubon Bldg., New Orleans 16, La. The states of ARKANSAS, LOUISIANA and MISSISSIPPI; in the state of TEXAS, the city of Texarkana; in the state of FLORIDA, the county of Escambia; in the state of ALABAMA, the counties of Mobile and Baldwin.

District No. 9, 324 U. S. Appraisers Stores Bldg., 7300 Wingate St., Houston 11, Tex. In the state of TEXAS, the counties of Angelina, Aransas, Atascosa, Austin, Bandera, Bastrop, Bee, Brooks, Bexar, Blanco, Brasoria, Brazos, Burleson, Caldwell, Calhoun, Cameron, Chambers, Colorado, Comal, DeWitt, Duval, Dimmit, Edwards, Fayette, Fort Bend, Frio, Galveston, Gillespie, Goliad, Gonzales, Grimes, Guadalupe, Hardon, Hays, Harris, Hidalgo, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kennedy, Kendall, Kerr, Kinney, Kleberg, LaSalle, Lavaca, Lee, Liberty, Live Oak, Matagorda, Madison, Maverick, McMullen, Medina, Montgomery, Nacogdoches, Newton, Nueces, Orange, Polk, Real, Refugio, San Augustine, San Jacinto, San Patricio, Sabine, Starr, Travis, Trinity, Tyler, Uvalde, Val Verde, Victoria, Walker, Waller, Washington, Webb, Wharton, Willacy, Williamson, Wilson, Zapata and Zavala.

District No. 10, 500 U. S. Terminal Annex Bldg., Dallas, Tex. The state of TEXAS except that part lying in District 9 and in the city of Texarkana; the states of OKLAHOMA and NEW MEXICO.

District No. 11, 539 Federal Bldg., Los Angeles 12, Calif. The state of ARIZONA; in the state of NEVADA, the county of Clark; in the state of CALIFORNIA, the coun-

ties of Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara and Ventura.

District No. 12, 333-A Customhouse, San Francisco 26, Calif. The state of CALIFORNIA except that part lying in District 11; the state of NEVADA except the county of Clark.

District No. 13, 307 Fitzpatrick Bldg., Portland 5, Ore. The state of OREGON; the state of IDAHO except that part lying in District 14; in the state of WASHINGTON, the counties of Wahkiakum, Cowlitz, Clark, Skamania and Klaskanine.

District No. 14, 808 Federal Office Building, Seattle 4, Wash. The state of MONTANA; the state of WASHINGTON except that part lying in District 13; in the state of IDAHO, the counties of Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce and Shoshone.

District No. 15, 531 New Customhouse, Denver 2, Colo. The states of COLORADO, UTAH and WYOMING; in the state of NEBRASKA, the counties of Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Kimball, Morrill, Scottsbluff, Sheridan and Sioux; in the state of SOUTH DAKOTA, the counties of Butte, Custer, Fall River, Lawrence, Meade, Pennington, Shannon and Washington.

District No. 16, 208 Federal Court Bldg., St. Paul 2, Minn. The states of MINNESOTA and NORTH DAKOTA; the state of SOUTH DAKOTA except that part lying in District 15; the state of WISCONSIN except that part lying in District 18; in the state of MICHIGAN, the counties of Alger, Baraga, Chippewa, Delta, Dickinson, Gogebie, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and Schoolcraft.

District No. 17, 3200 Fidelity Bldg., Kansas City 6E, Mo. The states of KANSAS and MISSOURI; the state of IOWA except that part lying in District 18; the state of NEBRASKA except that part lying in District 15.

District No. 18, 1300 U. S. Courthouse Bldg., Chicago 4, Ill. The states of ILLINOIS and INDIANA; in the state of IOWA, the counties of Allamakee, Buchanan, Cedar, Clayton, Clinton, Delaware, Des Moines, Dubuque, Fayette, Henry, Jackson, Johnson, Jones, Lee, Linn, Louisa, Muscatine, Scott, Washington and Winnebago; in the state of WISCONSIN, the counties of Brown, Columbia, Calumet, Crawford, Dane, Dodge, Door, Fond du Lac, Grant, Green, Iowa, Jefferson, Keewauqua, Kenosha, Lafayette, Manitowish, Marinette, Milwaukee, Oconto, Outagamie, Racine, Richland, Rock, Sauk, Sheboygan, Walworth, Washington, Waukesha and Winnebago; the state of KENTUCKY except that part lying in District 19.

District No. 19, 1029 New Federal Bldg., Detroit 26, Mich. The state of OHIO; the state of MICHIGAN except that part lying in District 16; the state of WEST VIRGINIA except that part lying in District 4; in the state of KENTUCKY, the counties of Bath, Bell, Boone, Bourbon, Boyd, Bracken, Breathitt, Campbell, Carter, Clark, Clay, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Gallatin, Garrard, Grant, Greenup, Kenton, Harlan, Harrison, Jackson, Jessamine, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Lewis, Lincoln, Madison, Magoffin, Martin, Mason, McCreary, Menifee, Montgomery, Morgan, Nicholas, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Scott, Wayne, Whitely, Wolfe and Woodford.

District No. 20, 328 Post Office Bldg., Buffalo 3, N. Y. The state of NEW YORK except that part lying in District 2; the state of PENNSYLVANIA except that part lying in District 3.

District No. 21, 609 Stangenwald Bldg., Honolulu, T.H. The territory of HAWAII and outlying Pacific possessions except Alaska and adjacent islands.

District No. 22, 323 Federal Bldg., San Juan, P.R. PUERTO RICO and the VIRGIN ISLANDS.

District No. 23, 6 Shattuck Bldg., Juneau, Alaska. The territory of ALASKA and adjacent islands.

In any event, you certainly will want to make use of the excellent code-practice service available from the League Headquarters station, W1AW. Starting May 1st, W1AW began a schedule of slow-speed code practice transmissions commencing at 9:30 p.m. EST on Sundays, Tuesdays and Thursdays, and at 8 p.m. EST on Saturdays. These sessions start at five words per minute and progress over the period of about an hour through 7½, 10 and 15 w.p.m. (On other evenings of the week, code practice begins at 9:30 p.m. EST at speeds of 15 w.p.m. and up.) The frequencies: 1887, 3555, 7215, 14,100, 52,000 and 146,000 kc., all simultaneously. See page 70 of the April and May issues of *QST* for additional dope.

As for the written examination, FCC has now released a set of 28 questions which cover the field of knowledge in which the Novice applicant is expected to be prepared. These, with appropriate answers, will be detailed at the end of this article. The exam itself will consist of 20 questions selected from the material covered by the 28 examples, but not in the same form. They, like those on all present-day amateur written examinations, will be of the "multiple-choice" type, where several possible answers are already provided but only one is correct. For example, a question on the Novice Class examination might be:

The maximum power input permitted in a station licensed to an amateur of the Novice Class is:

- a) one kilowatt
- b) 75 watts
- c) 1000 volts at 100 milliamperes
- d) whatever power is necessary to maintain communication
- e) not more than the maximum rating of the tubes

Of course, (b) is the correct answer. All you need do is indicate the correct answer. Obviously if you know your stuff it requires only a moment to mark down the right answer. If you don't, you're in for trouble. So be prepared. When you can answer all the example questions, and understand the basis of the answers, you're all set. Be sure to read the questions on the examination carefully before you answer; FCC finds many wrong answers obviously due to careless and hurried reading and some questions not answered at all because of carelessness.

When you get your ticket, you can go on the air under the provision for Novice privileges. You'll have a call different from the normal permutations. Although not officially decided at press time, it is expected that Novice calls in the continental United States will have WN prefixes.

Novice privileges are:

- 3700-3750 kilocycles — telegraphy (A-1)
- 26.96-27.23 megacycles — telegraphy (A-1)
- 145-147 megacycles — telegraphy (A-1, A-2),
telephony (A-3, f.m.)

The transmitter must be crystal-controlled and the input must not exceed 75 watts.

By the way, it is quite possible to apply for both the Novice and Technician licenses simultaneously. You would then take the 5-w.p.m. code test, and both written examinations. If you pass both, you get two call signs, one a distinctive Novice call and the second a regular call for your Technician privileges. As a matter of fact, if your code is just about 13 w.p.m. (required for General Class) but you're not too sure of it, you may apply for both General Class and Novice Class at the same time (if eligible for both — i.e., if not a previous holder of amateur license). You would then take the 13-w.p.m. test. If you pass, fine, and you proceed to the written examinations. If you fail, you can immediately take a crack at the 5-w.p.m. test and your Novice written exam. As a Novice, you may visit any other amateur station and operate it, but only under the conditions specified for the Novice license. Any other amateur operator (except Technician Class) may visit your station and operate it, but only under the conditions specified for the Novice license.

And now — go to it!

But keep one thing constantly in mind. Your Novice license, when you get it, will be good for one year only. It may not be renewed. You may not obtain Novice privileges again at a later date. You have a one-year period of on-the-air practice to improve both your code and technical skills to a point where you can pass the General (or Conditional) or Technician Class exam. You must do that within the year or go off the air. So stick mostly to c.w. operation to bring that code speed up. Continue your study of theory and regulations. As soon as you are ready, preferably long before the end of your Novice term, take a crack at the exam for the higher-grade license. If you should fail the first time, you can try again each thirty days.

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Now to the example questions and answers. As stated, these are not the actual ones in the examination. However, they adequately cover the field of knowledge required. If you can answer these questions satisfactorily and understand the basis of the answers, you need have no fear of the written exam. Throughout your study you should keep in mind that these FCC examination questions are intended as a sampling of your knowledge in regulatory and technical fields. Like every other amateur, you must be at least generally familiar with other aspects of the amateur regulations, since they will apply equally to you as a Novice. Get yourself a copy of the complete amateur rules; they're available from the Government Printing Office, Washington, D. C., 15¢ — or in the *License Manual*, which has not only the complete regulations but detailed interpretations and explanations of them. In the technical field, you will also need to engage in collateral use of suitable elementary literature available at your local library, from the League, or on loan from an amateur acquaintance.

(The references in parentheses at the end of answers to regulatory questions are to appropriate sections of the amateur rules or the Communications Act.)

1. What is the maximum input power permitted to the final stage of the transmitter in a station licensed to the holder of a Novice Class license or operated by such an operator?

The maximum input power permitted a Novice is 75 watts. (§ 12.23)

2. What is the maximum penalty for a violation of the rules and regulations of the Federal Communications Commission?

A fine of up to \$500 for each day during which the offense occurs, suspension of operator license, and revocation of station license. (Act, § 502)

3. On what frequency bands may the holder of a Novice Class license operate an amateur radio station?

3700-3750 kc.
26.96-27.23 Mc.
145-147 Mc.
(§ 12.23)

4. On what frequency bands may the holder of a Novice Class license operate an amateur radiotelephone station?

145-147 Mc. (§ 12.23)

5. What is the log of an amateur station, and what information is required to be entered therein? How long must it be preserved?

The log of an amateur station is the written record of transmissions. The log must show:

- 1) the date and time of transmission
- 2) the signature of each licensed operator operating the equipment and the name of any person not holding a license who speaks over a radiotelephone transmitter
- 3) call of the station called
- 4) the input power to the transmitter
- 5) the frequency band used
- 6) the type of emission used
- 7) the location of the station at the time of transmission
- 8) the message traffic handled

Information such as the input power, frequency band, type of emission, location of station, need be entered only once provided the conditions are not changed. Similarly, entry of the date need not be repeated for other transmissions made on that date. If the station is mobile, the approximate geographic location can be indicated in the log.

The log of an amateur station must be preserved for at least one year following the last date of entry. Similarly, any message traffic handled must be kept on file for at least one year. (§ 12.136)

6. What is the term of an amateur Novice Class license? Under what conditions may this license be renewed?

The term of an amateur Novice Class license is one year. (§ 12.29)

It may not be renewed under any conditions. (§ 12.27(b))

7. What are the rules and regulations regarding the transmission of improper language, false signals, or malicious interference?

The transmission of obscene, indecent or profane language, or of false or deceptive signals or call letters, or of malicious interference is expressly prohibited and there are heavy penalties for violation. (§§ 12.157, 12.158, 12.160)

8. What are the rules and regulations regarding purity and stability of emissions?

Below 144 megacycles, spurious radiations must be reduced in accordance with good engineering practice, and must not cause interference to near-by receivers of good engineering design not tuned to the transmitter. Voice modulation of a transmitter must not cause spurious emissions; the maximum modulation percentage is 100. Simultaneous frequency modulation and amplitude modulation is not permitted. The frequency of the signal transmitted must be as constant as the state of the art permits. (§ 12.133)

9. What method of frequency control is required to be used in the transmitter of a station licensed to the holder of a Novice Class license?

The frequency must be crystal-controlled. (§ 12.23)

10. What are the rules and regulations regarding the measurement of the frequencies of the emissions of an amateur radio station?

Regular measurement of the frequency of the transmitter is required. This measurement must be by means independent of the means used to control the transmitting frequency and must be of sufficient accuracy to ensure operation within the frequency band used. (§ 12.135)

11. Who may be permitted to operate the transmitter of an amateur radio station licensed to the holder of a Novice Class license?

Any amateur radio operator except of the Technician Class. (§ 12.28)

12. Under what circumstances may an amateur radio station be used by a person who does not hold a valid license?

A person not properly licensed may not operate an amateur station. However, he may speak over the microphone of an amateur radiotelephone station provided a duly-licensed operator is present to control the emissions. (§ 12.28)

13. What is the maximum permissible percentage of modulation of an amateur radiotelephone station?

One hundred per cent. (§ 12.133)

14. At what intervals must an amateur station be identified by the transmission of its call sign? May any transmission be made without identification of the station?

An amateur station must identify its call sign at the beginning and end of each transmission and at least every ten minutes if a single transmission lasts longer than ten minutes. No transmission by itself may be made without identification of the station, except that during a sequence of transmissions each less than three minutes long, the call sign needs to be given only once each ten minutes as well as at the beginning and end of the work. (§ 12.82)

15. Under what conditions is notice of portable or mobile operation required to be given, and to whom in each case?

Notice of intended portable operation, or mobile operation, must be given the FCC Engineer-in-Charge of the inspection district in which such portable or mobile operation is contemplated only when the operation is or is expected to be for a period longer than 48 hours. (§ 12.91)

16. What are the recognized abbreviations for: kilocycles, megacycles, Eastern Standard Time, Greenwich Mean Time, continuous wave, frequency modulation, amplitude modulation?

kilocycles — kc.
megacycles — Mc.
Eastern Standard Time — EST
Greenwich Mean Time — GMT
continuous wave — c.w.
frequency modulation — f.m.
amplitude modulation — a.m.

17. What is the relationship between a fundamental frequency and its second harmonic; its third harmonic, etc.?

The second harmonic is twice the frequency of the fundamental, the third harmonic is three times the fundamental frequency, and so on. A harmonic is always related to its fundamental frequency by an integral multiplier; i.e., 2, 3, 4, 5, 6, etc.

18. What is the relationship between a cycle, a kilocycle, and a megacycle?

1 kilocycle = 1000 cycles
1 megacycle = 1000 kilocycles = 1,000,000 cycles

19. What instrument is used to measure: electrical potential; electrical current; electrical power; electrical energy?

Electrical potential is measured by a voltmeter.
Electrical current is measured by an ammeter, milliammeter, or microammeter.

Electrical power is measured by a wattmeter.
Electrical energy is measured by a watt-hour meter.

20. What is the purpose of: a modulator; an amplifier; a rectifier; a filter?

A modulator is used to vary the amplitude, frequency or phase of the radio-frequency output of a transmitter for the purpose of transmitting information.

An amplifier is used to increase the amplitude, or power level, of a signal.

A rectifier is used to change alternating current into pulsating direct current.

The purpose of a filter is to attenuate undesired frequencies while simultaneously passing, without appreciable attenuation, a desired band of frequencies and/or direct current. (Examples: The power-supply "smoothing filter," which eliminates the alternating-current ripple from the output of a rectifier but permits direct current to flow with little or no attenuation; the "low-pass" filter, which attenuates all frequencies (such as harmonics in the output of a transmitter) above a given frequency but passes all lower frequencies.

21. What is meant by: amplification; modulation; detection; attenuation?

Amplification is the process of increasing the amplitude, or power level, of a signal.

Modulation is the process of varying the amplitude, frequency or phase of the radio-frequency output of a transmitter. Modulation is normally employed for the purpose of transmitting information. However, it may also occur inadvertently, as in the case of "hum" modulation of a signal resulting from ripple in the output of an insufficiently-filtered d.c. power supply.

Detection or demodulation is the process of extracting the information contained in the modulation on a radio-frequency signal.

Attenuation is a reduction in amplitude.

22. What is the purpose of: a radio-frequency choke; an audio-frequency choke; a filter choke?

The purpose of a radio-frequency choke is to oppose the flow of radio-frequency current while permitting direct current and audio frequencies to flow without appreciable opposition.

The purpose of an audio-frequency choke is to oppose the flow of audio-frequency currents while permitting direct current to flow.

The purpose of a filter choke is to aid in smoothing the direct-current output of a rectifier.

23. How is the actual power input to the tube or tubes supplying energy to the antenna of an amateur transmitter determined?

The input power is determined by measuring the direct-current plate voltage and the d.c. plate current to the tube or tubes in the final stage in the transmitter. The power input is equal to the plate voltage multiplied by the plate current in amperes. (Example: Two tubes in the final stage of the transmitter take 50 milliamperes each, at a plate voltage of 500 volts. The total plate cur-

(Continued on page 114)



United States Naval Reserve



Amateurs on Active Duty

The following Naval and Marine Corps reservists are in active military service. Asterisk denotes Marine Corps reservist. W9s BBL, CWM and GVM should be removed from the earlier lists published in March and April QSTs.

W1s DXU IPU TDY; W2s BPJ EQF SHM VZM YJP; W3s CAP DOM ETD MPB NKA NUL OGE OOL OSI OST OVS OWV PAP * PMW QL 8DS; W4s BL CH DRH HDM IKU JMX JRL KQD MDL MQE MYV MYX NVG NXN NXZ ODA OHO OTA OTY PPC PQC QDX QEL RCQ RCR RXO; W500T; W8s AXT CHT CJV CLT DIT EYI EMT FDT FFC KOX/4 MTC SAB UDT ZJY.

Storm Emergency

A mid-February storm hit commercial communications and utilities in cities throughout Texas, Oklahoma, and Arkansas. With Paris Texas, completely isolated for a number of hours, Volunteer Electronics Company 8-51 (K5NBY), working closely with available Naval Reservists and radio amateurs, utilized its radio equipment and emergency power to keep communications open to and from that city. Naval Reserve Training Center, Dallas (K5NRD), provided relay point for the Paris unit. Naval Reserve Training Centers at McAlester, Okla. (K5NBE), and Little Rock, Ark. (K5NRL), were also in operation, handling emergency traffic for isolated towns in Oklahoma and Arkansas.

Simulated Disaster

K7NAZ, Volunteer Electronics Company 13-11, Clarkston, Wash., served as communications center in a simulated disaster test of amateur radio facilities, conducted on February 19th in cooperation with the Lewiston (Idaho)-Clarkston Amateur Radio Club and ARRL Emergency Coordinator W7FRM. For purposes of the test, it was assumed that a bomb had been dropped on Lewiston. The club's TBS-50 transmitter was installed at K7NAZ and was used to dispatch several 28-Mc. mobile units. Participating were mobiles W7AOO, W7OOW, W7HKK, W7ONP, and W7DTJ. In addition, mobile stations of W7FRM and W7GMC (commanding officer, Electronics Company 13-11) were standing by for service as needed. Representatives of the Office of Civil Defense and the American Red Cross observed the test from K7NAZ and expressed admiration for the results obtained.

Practice in operation of radar is afforded by the Model SO-8 installed at Naval Reserve Organized Electronics Company 8-3 (K5NAU), Waco, Texas. L. to r.: Ernest J. Horton, chief electronics technician; Merle T. Alexander, aviation electronics technician; Lieut. (j.g.) A. T. Corbin (W5KXD), electronics officer; Colonel Wm. P. Clarke, jr. (W5DZ, ARRL emergency coordinator), U. S. Air Force Reserve. K5NAU has been designated a control station for emergency operations in the Central Texas area.

Here & There

Naval Reservists cooperated with the Lake County Amateur Radio Club in furnishing communications for the annual Klondike Race of the Oak Plain Council of Boy Scouts. The race was run between Zion and Waukegan, Ill. W9GYP manned the starting line station, K9NAB (Electronics Platoon 9-1, Zion). W9OSV operated in a jeep at the first hazard spot. Ten-meter mobile rigs were stationed at designated intervals along the race route with the following participating: W9s GMB FV8 GCW GDV CHV LFM UXS and OJZ, and W8FFQ. W9GCV and W9EUG operated the home base station where Scout officials, Mayor Coulson of Waukegan, and motion picture star Susan Cabot awaited the winning team.

K8NAX, Volunteer Electronics Company 9-180, Pittsburg, Kans., reports into the Kansas 75-Meter Emergency 'Phone Net on Tuesdays and Fridays. . . . K8NAI, Volunteer Electronics Company 9-116, Aberdeen, S. D., reports regularly into the South Dakota 100-Meter Emergency 'Phone Net on Monday evenings. . . . Commander C. C. Chisholm (W1FI) is new commanding officer of Volunteer Electronics Company 1-5; this unit has its quarters in the Police Station, Somerville, Mass.

In a letter to K1NRB, Les Mitchell (G3BHK), petty officer radio electrician, No. 1 District, Royal Navy Volunteer (wireless) Reserve, writes as follows:

"I am gathering news items for *Live Wire*, the magazine of the Royal Navy Electrical Branch, on naval-amateur radio news. . . . I also hope to arrange a hospitality scheme for all naval men visiting this country to enable them to be invited into the homes of G. Hams. . . ."

G3BHK is active on the 80-, 40-, 20-, and 10-meter amateur bands. Complete address is 965, Oxford Road, Reading, Berkshire, England.

The Ninth Naval District Reserve Master Control Station at Chicago conducts weekly radioteletype (RATT) tests with activities having such equipment. Successful RATT communication has been established with Naval Reserve Training Centers at Denver, Detroit, Dubuque, Duluth, Fargo, Fort Wayne, Indianapolis, Minneapolis, Omaha, Oshkosh, St. Louis and Sioux City.



Crystal Lattice Filters for Transmitting and Receiving

Part I—General Principles

BY C. E. WEAVER,* W2AZW, AND J. N. BROWN,** W4OLL

THE ever-present problem of overcrowding in the amateur 'phone bands has focused interest the last few years on increased selectivity in communication receivers and restricted spectrums of transmission. To restrict the window¹ through which we look at the radio spectrum has been the chief aim of many writers.^{2, 3, 4} In this article the authors will attempt to outline what can be done with a few inexpensive surplus crystals and standard i.f. transformers. Recent interest in crystal filters for single sideband⁵ has prompted this outline of a system that can be utilized both in receiving and transmitting. From the viewpoint of double-sideband a.m. reception a bandwidth of 5 or 6 kc. is required to handle the optimum spectrum transmitted. Single-sideband techniques dictate an optimum spectrum of 2.5 to 3.0 kc. It would be to our best interest to discard all of the frequencies except those essential for good intelligibility, since under these conditions the QRM is reduced and the signal-to-noise ratio improved. The ability of various receivers to attenuate the undesired adjacent channel signals is termed "skirt selectivity." The filters to be described achieve high attenuation outside the passband through the very high "Qs" of the crystals themselves. In some cases, the crystals used yield Qs of well over 10,000, which are certainly not obtainable in coil- and condenser-tuned circuits.

Theory

Let us take a short look at the theory behind the scenes for a moment. Many of the details have of necessity been omitted, and those included are only the barest outline possible.⁶

The equivalent electrical circuit of a piezoelectric crystal is shown at A in Fig. 1. The circuit has both a series-resonant frequency and a parallel-resonant frequency. This is shown graphically in B, where the reactance of the equivalent circuit is plotted for all frequencies

• This article tells how surplus low-frequency crystals may be put to use in a standard lattice network to give band-pass characteristics that will enhance the selectivity of communications receivers. A brief theoretical explanation of lattice-filter characteristics and how they are derived is outlined. In Part II, a single-sideband transmitter utilizing a typical lattice will be described in sufficient detail to permit the average amateur to duplicate it.

between zero and infinity. The series-resonant frequency, f_r , occurs first where the curve crosses the zero-reactance line, and the parallel-resonant (antiresonant) point, f_a , occurs where the line rises to high values of inductive reactance (+) and then breaks sharply through zero to a high capacitive (-) reactance. For most crystals, the two resonant frequencies occur within a few hundred cycles of each other. It is these two resonance points and what we can do with them that will occupy our attention for a moment. The

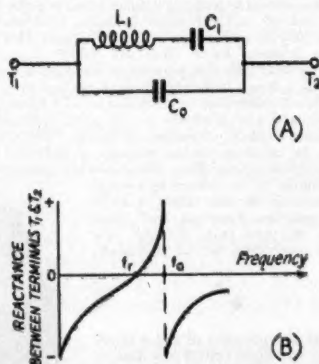


Fig. 1 — The equivalent electrical circuit of a piezoelectric crystal (A). The reactance varies with frequency as in (B).

problem is to spread these two resonant frequencies so that the crystals can be used as elements in a filter network. This "spreading" can be done by using either a series or a shunt inductance with the crystal already considered. Fig. 2 shows the result of shunting a crystal with a coil. You will note that not only have we separated f_r and f_a but we have created a new

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** Herndon, Va.

¹ "How To Visualize a 'Phone Signal," *QST*, July, 1950;
² "Tuning and Checking S.S.B. Signals," *QST*, October, 1950.

³ Hints & Kinks, "Greater Selectivity with the Lazy Man's Q8'er," *QST*, March, 1950.

⁴ Bane, "The Single Sider," *CQ*, May, 1949.

⁵ Goodman, "A Sharp I.F. Amplifier for 'Phone or C.W.," *QST*, December, 1950.

⁶ Edmunds, "A Crystal-Filter S.S.B. Exciter," *QST*, December, 1950.

⁷ For a more complete treatment on the subject, see W. P. Mason, *Electromechanical Transducers and Wave Filters*, D. Van Nostrand Company, Inc., publishers.

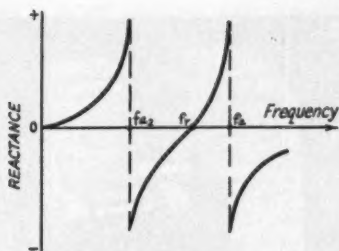


Fig. 2—Reactance plotted against frequency for a crystal shunted by an inductance.

parallel-resonant point, f_{s2} , which will be of use to us later.

Now, let's choose two pairs of identical crystals and connect them as shown in Fig. 3. You will notice that the shunt coils mentioned above have been moved to the input and output of the lattice network. This is accomplished by a mathematical transformation beyond the scope of this article. Suffice to say, the coils have the same effect as if they were connected directly across the crystals. This, of course, suggests the use of radio-frequency transformers (ordinary i.f. transformers) as input and output devices as well as spreading coils for f_r and f_s . It might be well to mention at this point that when f_r and f_s are spread, f_r remains fixed in frequency and only f_s is moved higher in frequency.

Let us briefly consider what happens inside the lattice filter. Assume that the pair of crystals connected in shunt (\times connected) are of identical frequency and are about 2 or 3 kc. higher in frequency than the pair of identical crystals connected in series (horizontally connected). Also assume that the coils used have spread the f_r and f_s of each crystal. Any overspreading can be corrected by the i.f. transformer tuning condensers, provided the crystals are exactly paired. (See later section on filter alignment.) A of Fig. 4 shows the reactance plot for both sets of crystals, the shunt pair being represented by the dashed curve. Careful alignment is necessary to make the series-resonant frequency of the series crystals (solid curve) correspond to the parallel-resonant frequency of the shunt-connected crystals

(dashed curve) and vice versa. The attenuation curve, B in Fig. 4, shows the resulting bandpass characteristic. We have points of very high attenuation (f_{s1} , f_{s2} , and f_{s3}) where the reactance values are equal and have the same sign (either + or -). We have a bandpass for those frequencies where the reactances of the two filter arms are opposite in sign.

If the reader is familiar with the operation of any of the various forms of bridge circuits, it will be reasonably obvious how the lattice (another name for a bridge) yields the characteristic shown in B. When the reactances of the bridge arms are equal and of the same sign the signals

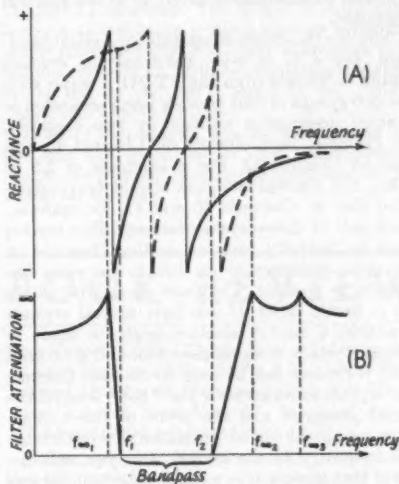


Fig. 4—The reactance-vs.-frequency characteristic for the two pairs of crystals in a lattice filter section is shown at (A). The resultant attenuation characteristic is shown in (B). (From *Electromechanical Transducers and Wave Filters*, W. P. Mason, Bell Telephone Laboratories, Inc., D. Van Nostrand Company, Inc., 1948.)

through the two possible paths of the bridge will cancel out. When the reactances are of opposite sign there will be partial transmission through the network with the maximum signal transmitted in the passband at the points where the reactances are equal in amplitude, but still opposite in sign.

Practical Filters

After spending much time poring over the available literature on this subject, the authors were almost convinced that it was practically impossible to build one of these filters without just the right cut of crystal and the correct mounting. Nevertheless, a workable filter can be constructed at the cost of only a very few dollars! The FT-241-A low-frequency

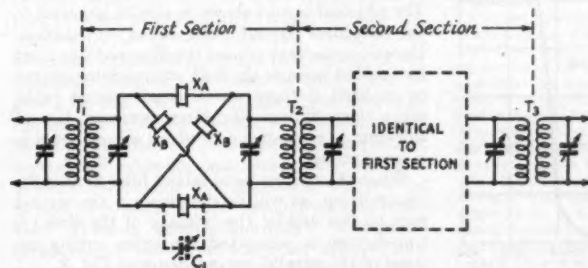


Fig. 3—Schematic diagram of a two-section crystal lattice filter.

T_1 , T_2 , T_3 —Replacement-type i.f. transformers.
 X_A , X_B —Matched pairs of FT-241 crystals (see text).
 C_1 —1- to 5- μ fd. ceramic condenser (see text).

surplus crystals were tried with very good success. Very inexpensive coupling devices were used, ordinary replacement i.f. transformers (Meissner No. 16-5712). There is one sacrifice made that was probably due either to an improper choice of transformers or an impedance mismatch between crystals and transformers. This was an insertion loss of approximately 12 to 15 db. in the middle of the passband. However, the authors felt that this did not handicap the system too greatly, as this was less than could be gained in a single stage of ordinary i.f. amplification. A more careful study would undoubtedly be helpful in this matter of insertion loss, but available time and practical considerations forced us to the solution presented.

Now for the choice of crystals for a given bandpass. For a 5- or 6-kc. bandpass the crystals should be chosen from the FT-241-A series with the two groups of four crystals being separated in channel designation number by two channels; for example, four crystals on Channel 40 and four on Channel 42. For a bandpass of 2.5 or 3 kc., the channel numbers should be consecutive; that is, Channels 40 and 41, for example. Each pair of these crystals for each filter section must be carefully matched so that they are on the same frequency or as close to the same frequency as possible. The pairs should be *within ten or twenty cycles*. If you have several crystals available, a careful selection might be made to match crystals. A signal generator and a vacuum tube voltmeter can be used to do this. Connect the crystal in series with the "hot" lead of the signal generator and the probe of the v.t.v.m. Now sweep the signal generator slowly through the frequency of the crystal, and you will discover that there will be a small indication for any randomly chosen frequency. As the generator frequency is increased through the crystal's fundamental frequency, the v.t.v.m. indication will increase sharply to a very high value and then will break sharply to a very low value,

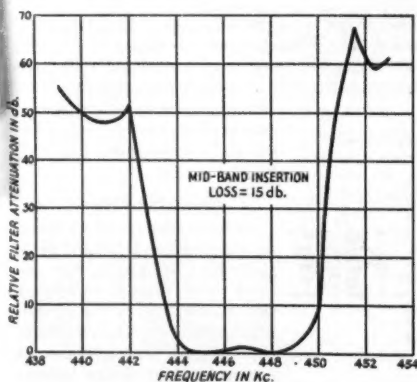
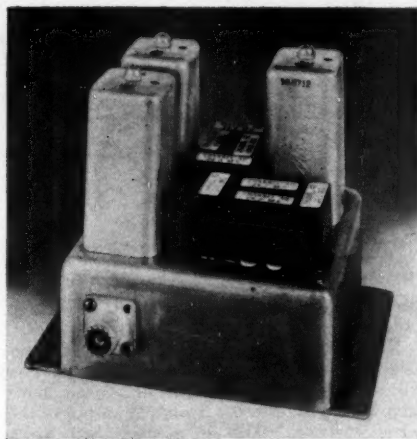


Fig. 5 — Attenuation characteristic of an experimental crystal lattice filter (two sections) suitable for receiver use. The crystals were Channels 40 and 42 of the FT-241 series.



An experimental crystal lattice filter for receivers using surplus crystals. Its attenuation characteristic is shown in Fig. 5.

perhaps unreadable on the instrument. The high indication was the series-resonant frequency, f_s , and the null was the parallel or antiresonant frequency, f_p . With a lot of patience and a little cussing, it will be possible to match pairs of crystals using this method. Edge grinding of the lower one of a pair of crystals will fix this matching problem. But be careful — only one or two very light swipes on the fine-grain side of a new flat carborundum stone. And take heart, because it sounds worse than it actually is. What happens if these crystals are not closely matched? There will be very narrow attenuation slots in the edges of the passband of the filter. The commercial companies get around this problem by putting two sets of silver plating on a crystal and attaching four terminals, making the one crystal serve as two identical crystals. It's a very nice trick but not too practical for a ham to try.

Now, assuming that you have eight crystals chosen, four crystals per section, each section requiring two pairs of identical crystals, we will proceed. Mount them as shown in the photograph of the sample filter, or in any convenient manner. The physical layout shown is almost identical to the electrical layout. One word of caution: Capacitive leakage around the filter sections must be avoided because the high attenuations cannot be realized if there are alternate signal paths other than through the filter elements. Use of shielding is recommended where serious trouble is encountered.

When the narrow-band lattice filter is used for transmitting, as will be described in the second part of this article, the primary of the first i.f. transformer is connected for series tuning instead of the parallel tuning shown in Fig. 3.

Alignment

To align either of the two filters, the following equipment or combinations of equipment will be

needed: a BC-221 frequency meter or equivalent calibrated source of r.f. energy covering the range of 400 to 500 kc., a low-frequency receiver such as the BC-348, BC-453, or a panoramic adapter whose input covers the frequency range we are concerned with. In lieu of the receiver or panoramic adapter, a simple crystal-controlled converter could be built to heterodyne the low-frequency in question up to a range covered by an existing high-frequency receiver. Use of the receiver and S-meter as a tunable vacuum tube voltmeter indicator is suggested if the approximate "db. per S unit" value is known.

Specific step-by-step adjustments for alignment of these filters will not be given in this article. They would be long and space-consuming and rather pointless in an article of this general nature. Instead, a few pointers will be given, and we have faith that the old ham ingenuity will fill in the rest. The first step is to peak the i.f. transformers for the midband frequency of the filter. It may be necessary to align each roughly with the signal source and indicating instrument

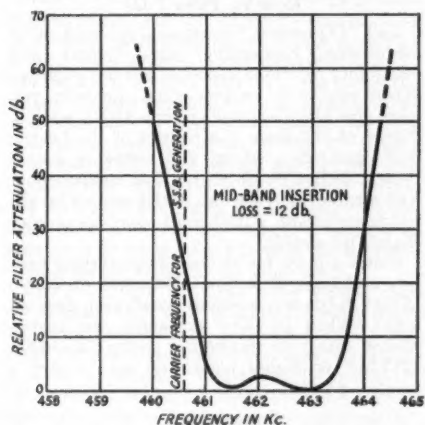


Fig. 6—Attenuation characteristic of an experimental crystal lattice filter (two sections) suitable for a s.s.b. receiver or transmitter. The crystals were Channels 49 and 50 of the FT-241 series.

coupled loosely to each separate transformer in turn in order to get sufficient signal through the whole filter for further alignment. Once this is done, the various sharp peaks and valleys in the passband characteristic must be ironed out to give a smooth shape. If you have been careful in the matching of the crystals, the passband will be fairly well defined. Mismatch of these pairs of crystals will cause the passband to be bumpy and attenuation outside the passband will not be as high as possible. A little cut-and-try is in order here. Place a small "gimmick" condenser⁷ across one of the higher-frequency crystals and run the signal generator through the frequency

⁷ A gimmick condenser is a low-capacity affair made by twisting two No. 22 enam. wires together for an inch or so. The capacity is reduced by cutting the wires.

of the filter again. You will have to judge whether you are doing any good; if not, try another value for the little gimmick condenser. Usually only one or two $\mu\text{fd.}$ will be sufficient to align a typical off-frequency crystal. You will notice that the trimmer adjustments on the i.f. transformers may be used to equalize the passband characteristic and make it as flat as possible.

Applications

The two obvious places where these filters could be put to good use are in receivers and in single-sideband transmitters. The best place to add such a filter in a standard communications receiver would be between the first detector and the first i.f. amplifier. This might be a bit cumbersome to add to an existing receiver without a major rebuilding job. The other alternative is to build a separate i.f. strip incorporating the filter in the line-up and use it much as the popular "lazy man's Q5-er" is used.

[Part II will describe how the narrow-band lattice filter can be put to use in a single-sideband exciter and yield excellent suppression of the unwanted sideband. — Ed.]

BOOK REVIEW

Kay Everett Calls CQ, by Amelia Lobsenz, 196 pages plus appendix, $5\frac{1}{2} \times 8\frac{1}{2}$ inches. Published 1951 by the Vanguard Press, 424 Madison Avenue, New York 17, N. Y. A Junior Literary Guild selection. Price \$2.50

Here is an interesting and fascinating book with which to introduce your young daughter — or any young girl or boy — to the "exciting world" of amateur radio. Written as a result of a cross-country trip, most of the incidents and much of the color stem from actual experiences. Mrs. Lobsenz is well qualified to write on the subject of amateur radio, having been a licensed amateur (W2OLB) for many years as well as an experienced author.

This reviewer was intrigued by the clever manner in which the authoress introduces and explains the subject of amateur radio and, in fact, answers many of the questions which a neophyte might ask of an amateur. In addition to the many incidents portraying amateur radio around which the story is woven, a complete appendix includes such information as call prefixes, Q signals and abbreviations, the International Morse code and a selected list of helpful publications.

The story relates a trailer trip taken during a summer vacation by Kay Everett and two other high school girls who join college student Jane Carlton, a W4, in touring the western portion of the country. They meet with many adventures including a tangle with a jewel thief. The girls' own trailer is ransacked and this sends them chasing after the thief as they continue with their sight-seeing. Kay, who has been receiving instructions on amateur radio from Jane, is able to trap the thief by going on the air for the first time in an exciting climax to the story.

In a lucid style many breathtaking scenes of the West are viewed by the reader through the girls' eyes. Amateur radio is used by the girls to contact their parents at home and to visit with other hams along the way, as well as to introduce Jane to a young man, also an amateur, who takes more than a casual interest in her.

Amateur radio is accurately portrayed and in a way that should awaken the interest of every reader as they journey across the United States in the trailer "Solus" with the four vacationists. — H. P.

On the Air *with* SINGLE SIDEBAND

THERE were no reports of two-way trans-Atlantic work on 75, but it wasn't for lack of trying. The gang on this side was lined up looking for the Gs on schedule, but no QSOs came out of it. This fall should see plenty of contacts, though, if the band conditions continue in the present trend.

G3CU and G3FHL are still holding down the 80-meter fort in England, and LA6U is on also. OZ7T seems to be the one to look for one 20 — he worked W2JJC recently.

W2ZKW (ex-W3LDS) first got on s.s.b. over a year ago. He runs 200 watts to a pair of 811s driven by an 807 from a phasing exciter, and has a 304TTL final in the works. Like so many of the others, he believes that "... s.s.b. is tops for hams due to no TVI, low cost, and high power with minimum of equipment."

Nick of W4MXL in North Carolina is using a pair of 807s in parallel Class AB₁, with 1100 volts on the plates and 150 watts peak input. He started on 20 meters and in 8 months worked only 11 s.s.b. stations, so he became disgusted and joined the gang on 3999 kc. With over half of his antenna in the attic, Nick has worked 102 different stations on s.s.b. since last November. Plans call for a new final using a pair of 250THs.

Bud of W6WB in San Francisco would undoubtedly have appeared sooner on s.s.b. if several other projects hadn't sidetracked him along the way, but right now he is making up for lost time on 20. The rig is a filter job starting at 10 kc. with a 1N34 lattice modulator, then to 470 kc. and 14 Mc. through a couple of 6SN7 balanced modulators and crystal oscillators, and a 6AG7-807-p.p. 4-250A linear running a kilowatt on peaks. Without resorting to carrier he raised 11 countries during the first two weeks, and also worked JA2OM while running only 10 watts to the 807. But the real pipeline seems to be to VK2CP (14,155), about whom Bud says, "I never thought I would hear a VK come in like he does, and he reports me the same way. We can talk for as long as we please. We haven't been cut off yet, although there has been fearful QRM on occasions." VK2AC (14,160) has also been worked.

Don't miss the article this month by W2AZW and W4OLL on lattice-type crystal filters. It looks like a real contribution to the amateur s.s.b. art and should help still more fellows to give the stuff a whirl. — B. G.

**SWITCH
TO SAFETY!**



V.H.F. QSO Party

June 9th - 10th

Certificates for Leaders

ARRL is pleased to announce another of its popular V.H.F. QSO Parties. All amateurs who can work any band or bands above 50 Mc. are invited to participate in this activity. The Party will be held during a 32-hour period starting at 2:00 P.M. local standard time, Saturday, June 9th, and ending at midnight local standard time, Sunday, June 10th. It will provide opportunities to work new v.h.f. DX and renew old friendships during a week end of concentrated activity on the bands above 50 Mc. Coming as it does two weeks before the Annual ARRL Field Day, it is an excellent time for a pre-FD workout of v.h.f. equipment.

How To Take Part

Call "CQ contest" to get in touch with other contestants. Exchanging signal-strength and readability reports is suggested but not required. When you work another v.h.f. amateur, you must give him the name of your ARRL section. Page 6 of this issue is a register of the League field-organization set-up, and serves as a convenient section check-off list. You compete only with amateurs in your own ARRL section for the certificate award. ARRL staff members are not eligible for awards.

Count 1 point for successfully-confirmed two-way exchanges of section information on 2 or 6 meters. A one-way exchange, confirmed, does not count. When two-way exchanges are accomplished with your transmitter on the 220-, 420-, 1215-Mc. or higher band, you may record 5 points per QSO.

Multiplier

The sum of station points earned is multiplied by a section multiplier. Each time a new section is worked two-way it adds one to the multiplier. *The multiplier grows by one if you rework this same section on another band.* (Scoring differs in this respect from other ARRL competitions to encourage everyone to make use of as many v.h.f. bands as possible.) A simple tabulation with points and section list is all that is required. A card to Headquarters will bring the simple form on which to report; or your own similar tabulation will be accepted.

Rules

- 1) Name-of-section exchanges must be acknowledged by both operators before either may claim the point(s).
- 2) All claimed contacts must fall in the contest period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.
- 3) Fixed-, portable- or mobile-station operation under one call, from one location only, is permitted.
- 4) The band your transmitter is on determines whether

(Continued on page 114)



The World Above 50 Mc.



CONDUCTED BY E. P. TILTON,* WHDQ

If there is one feature of the world above 50 Mc. that sets it apart from the rest of amateur radio, it is the lack of saturation that characterizes v.h.f. operation. While lower frequencies have been almost constantly overloaded for a generation, v.h.f. enthusiasts have never had enough company for any extended period. Except for heavy occupancy in a few metropolitan areas during the transitions from wide-band to narrow-band techniques, first on 56 Mc., and later on 144, there has never been a QRM problem on the v.h.f. bands.

The discovery in the early '30s that inexpensive receiving tubes and simple circuits could be used for communication on 56 Mc. gave that band a boost in the form of thousands of hams looking for a low-cost way to while away the extensive spare-time hours of the depression period. This boom moved to 112 Mc. in the years prior to the outbreak of World War II. A flood of SCR-522s and other surplus gear brought new blood to 144 Mc. early in the postwar period, and the lure of world-wide DX, looming over the v.h.f. horizon for the first time as a result of a sunspot cycle peak, helped to swell the numbers making use of 50 Mc. in the same years.

But to most of us it has never seemed that we've had enough v.h.f. men, and recently there has been something of a recession. TV, just plain TV, less spare time — you name the cause — all of us recognize that the early months of 1951 brought somewhat more than the normal seasonal slump in v.h.f. operation. Several developments now loom, however, that could well mark the beginning of another period of v.h.f. expansion. The first is emphasis on v.h.f. in civil emergency planning. Another is the imminence of two new classes of amateur license, both of which may have considerable impact on the world above 50 Mc.

The v.h.f. bands are attractive territory for the beginner, particularly if he must operate with a limited financial outlay. Interesting results are possible with low power, and there are many opportunities for the fellow with an experimental turn of mind. These attributes could be important in attracting the Novice and Technician Class licensees who will be appearing on the amateur scene after July 1st.

Though the Novice will have limited c.w. privileges on 3.7 and 27 Mc., it may well be in the 144-Mc. band that he will find his greatest pleasure. Are we prepared to help him get started, and to keep him going along the road

to full amateur status before his one-year license runs out? There is widespread interest in the Novice License — the Headquarters mailbag confirms that — this interest may represent a reservoir of v.h.f. newcomers unmatched in recent years.

Perhaps even more important to the future of 220, 420 and higher bands is the Technician Class license, a 5-year renewable ticket requiring the same technical knowledge as the old Class B, but with a 5-w.p.m. code speed to encourage the experimenter who may have had trouble with the code. Allowing operation only on the frequencies from 220 Mc. up, it could be the means of promoting activity on those bands far beyond anything yet seen there.

Early inquiries have not shown great interest in the Technician Class license, but a considerable expansion in this direction seems likely. At the very least it represents a permanent ham ticket for the Novice who may not be ready to step up to a higher grade of license at the end of his trial year on the air. At best, it could be the making of our higher frequencies. Many beginners, including your conductor, were sufficiently intrigued by the possibilities inherent in v.h.f. work to get themselves Class B tickets back in the early '30s. Certainly as much can be done on the Technician bands in 1951 as was possible on 56 Mc. in 1931.

It is up to us, the active v.h.f. men, to see that we don't miss the opportunities inherent in the release of these new licenses on July 1st. Both as individuals and in our radio clubs, we have a job to do!

Here and There on the V.H.F. Bands

As always, April was mainly noteworthy for the occasional hints it offered of better things soon to come. Ranges were stretching out on 144 Mc., particularly in warmer parts of the country, and the first sporadic-E skip of the season flushed some of the 50-Mc. gang out of the bushes for the first time since last fall. Even on 420 Mc. there were signs of things opening up. Just as our calendars turned over to May, the v.h.f. DX season got under way in earnest.

If TV has done nothing else for us, it has helped to alert some of the gang to openings that might otherwise have passed unnoticed. On April 29th, when the East was catching its first 50-Mc. DX, several fellows were heard to say that a clutter of signals on their TV screens tipped them off that something was up. For several hours, beginning in the late afternoon, there was surpris-

* V.H.F. Editor, QST.

ing activity on 6, all the way from Maine to Florida.

The TV sets gave the warning again on the afternoon of May 1st, when the season's best aurora opening was developing. Beginning in midafternoon and continuing until nearly 9 p.m., the 50-Mc. band was open, and 144 Mc. was doing its stuff for at least two hours around sundown. Complete details are not available as we write, but detailed observations will be welcomed for study. At least one 144-Mc. "first" resulted when W1IZY, Middleboro, Mass., worked W9UCH, Ft. Wayne, Ind., for what is believed to be the first 144-Mc. work between these states.

The 50-Mc. band was found open by HK1DX on March 18th, 19th, 25th, 26th and 27th, and in April on the 14th and 16th, always to Argentina. On the latter date it was noted that the 10-meter band was open to Argentina and the United

States, with strong steady signals from both countries until around 8:30 p.m. Then a fast fade set in on the 10-meter signals and the 6-meter band opened to Argentina at almost the same time. Colombia now has three 50-Mc. stations, HK1CA, HK1DX and HK1DW.

The article in May QST listing all known certificate and other awards available to amateurs was hardly on the presses before we received word of a new one, now being offered by the Rochester V.H.F. Group. Their v.h.f. WAR award is available in two forms. One is for any fixed station located more than 25 miles from the intersection of Main and Clinton Streets, Rochester, working 15 or more Rochester v.h.f. stations since January 1, 1949. The other is for stations inside this area who have worked 25 or more Rochester v.h.f. stations. Members of the Rochester V.H.F. Group outside the defined area are considered as Rochester stations. Application forms for the award are available from Henry A. Blodgett, W2UTH, 38 Duffern Drive, Rochester 16, N. Y.

Increases in 2-meter activity are reported in several parts of W7. From Sheridan, Wyoming, comes the good news that W7JRG has now succeeded in making contacts outside of local, the first success coming after several tries with W7HNI, Wyoming SCM, at Gillette. This is an 83-mile path with rough terrain intervening. W7OWZ, Laramie, tells us that in addition to regulars, W0ELL, W0FRQ, W7MVK and W7OWZ, the 2-meter band is now being tried out by W7MNX, W0NDJ and W0DD. W7OWZ's log for March showed 63 QSOs on 144 Mc.

New 2-meter stations are appearing in the Rogue River Valley of Southern Oregon, according to W7OVO of Medford. Kenn says that he and W7s BEG and HLF have found it possible to work over the mountains to W7KTG in Ashland. This is a short distance, but the fact that the high mountains surrounding their valley locations have not prevented their making the hop is attracting new interest. Other 2-meter stations in the region include W7s EQ RE DBZ LNG and OJA.

In and around Everett, Wash., there had been a few regulars on 2, but activity was waning until the band was put to work in civil emergency planning. Beginning around the first of 1951, activity has increased rapidly. W7KYV reports that crystal-controlled converters and beams have been blossoming out all over, the list of regularly active stations now including W7s LBP BTN DF KYV JFB PED KGQ and DYD. QSOs between Everett and Seattle, Olympia, Tacoma and British Columbia are commonplace, and now the objective is regular contact with the Yakima area, some 120 miles over the Cascades.

Many tries had been made over this path previously without success, but the first break came on April 1st, when W7AWX heard the signal of W7LBP, while contact was being maintained on 75. On the 4th, W7AWX heard both stations on 144 Mc., and this time two-way contact was established for the first time. This was without

2-Meter Standings

Call			Call			
States	Area	Miles	States	Area	Miles	
W1HDQ	16	6	500	W5FSC	5 2 500	
W1IZY	14	5	570	W5JLY	4 2 650	
W1MNF	14	5	570	W5ONS	4 2 600	
W1BCN	13	5	500			
W1CTW	12	4	500	W6ZEM/6	1 1 415	
W1KLC	12	4	500	W6GGM	1 1 300	
				W6YYG	1 1 300	
W2BAV	21	7	1175			
W2NLY	18	6	750	W8WJC	20 7 775	
W2PAU	15	6	740	W8BFQ	20 7 775	
W2DFV	13	5	350	W8WVX	18 8 1200	
W2CET	12	5	405	W8UKS	18 7 720	
W2DPB	12	5	500	W8EP	17 7 —	
W2QED	12	5	365	W8WRN	16 6 670	
W2FHD	12	5	—	W8RWV	14 7 500	
W2QNZ	12	5	—	W8WSE	14 6 620	
				W8FQK	13 7 —	
W3RUE	17	7	760	W8CYE	12 6 —	
W3NKM	17	7	660	W8BAX	12 — 655	
W3QKI	16	7	820	W8CPA	12 — 650	
W3LNA	14	7	720			
W3KWL	14	6	490	W9FVJ	20 7 790	
W3GKP	13	6	610	W9UCH	18 7 650	
W3OWW	13	6	600	W9EQC	17 7 820	
W3KBA	13	6	—	W9SUV	17 7 —	
W3KUX	12	5	575	W9BOV	15 6 —	
W3PGV	12	5	—	W9WOK	15 5 690	
W3LMC	11	4	400	W9AFT	14 — —	
				W9NFK	12 7 600	
W4HHK	15	6	650	W9UIA	11 7 540	
W4JDN	13	6	—	W9FPE	11 5 800	
W4JFY	13	5	720	W9GTA	11 5 540	
W4IKZ	13	5	650			
W4JFU	13	5	830	W0NFM	14 7 660	
W4LVA	13	5	400	W0IHD	13 6 725	
W4MKJ	12	7	665	W0EMS	13 5 1080	
W4OXC	12	7	500	W0ZJB	12 7 1097	
W4CLY	12	5	720	W0WGZ	11 5 700	
W4JHC	12	5	720	W0HXY	8 3 —	
W4OLK	12	5	720	W0JHS	7 3 —	
W4FJ	12	5	700			
				VE3AIB	12 6 600	
W5JTI	14	5	670	VE1QY	11 4 900	
W5ML	8	3	725	VE3BOW	8 5 520	
W5ERD	8	3	570	VE3BQN	6 4 540	
W5VY	7	3	1200	VE3BPP	6 4 525	
W5CVW	7	2	560	VE3DER	6 4 450	
W5AJG	7	2	450	VE3EAH	5 4 390	
W5FBT	6	2	500			
W5FEK	6	2	500			
W5IRP	6	2	410			

the aid of the 75-meter link, that band being so loaded with W9 signals that the two W7s couldn't hear each other! On the 9th, W7LBP and W7AWX worked again, and W7CMX at Olympia also got through. By this time it had been found that the best path was by way of rebound from Mt. Rainier, a 14,408-foot peak that is visible almost everywhere within a 100-mile radius.

The boys with the best rigs, receivers and antennas are the ones who are making the grade, so far, and the success over this long mountainous hop is stimulating new and renewed interest in 144 Mc. on both sides of the Cascades.

The World Above 420 Mc.

With the inversion season well along, interest in 420 is picking up again. Several operators have written in to tell us of plans for hilltop work during the June V.H.F. Party and the Field Day, and it seems quite likely that a new 420-Mc. record may be on the books before the summer is over. When one has observed the strength that 144-Mc. signals attain over paths of 500 miles or more when conditions are right, it is hard to believe that even the simplest kind of 420-Mc. rigs wouldn't be capable of making the same hops.

The 420-Mc. DX season got underway for W2QED, Seabrook, N. J., on April 28th. On Ken's weekly 8 A.M. sked with K2AH, East Orange, around 100 miles to the north, his signal was heard for the first time in months. Then after midnight that night he worked W3BSV, Salisbury, Md., with S9-plus signals over the 78-mile path. W3AIR, Glenmont, Md., was also hearing W2QED. W3OWW, Stewartstown, Pa., was heard by both W2QED and W3AIR, but Geary did not have his receiver in working order, to make it two-way.

W2QED is now running 120 watts input to an AX-9903 straight amplifier, driven by another as a tripler. A completely-shielded final stage, cooled by a blower, makes it possible to run this much power. Ken's frequencies are 145.8 and 437.4 Mc. The band has been kept active during the slack months by a few stations around Philadelphia, including W2EH, Collingswood, N. J., W3NAG, Havertown, Pa., and W3OFK, Yeadon, Pa. W2TM, Bridgeton, N. J. is a new arrival.

Several 420-Mc. stations are working out regularly in Springfield, Mass. W1KJB, W1NH and W1CCH are on nearly every night and will be glad to make tests, either two-way or crossband to 144 Mc., with interested parties. W1KJB has a pair of 8012s and an ASB-series receiver. The others are using crystal-controlled 832As. W1KJB also has a portable with a pair of 368As for some mountain-top tests this summer. Bill, it may be recalled, was a prewar 112-Mc. record holder, so his potentialities in this department should not be sold short. As W2MPY/1 he worked 335 miles on 112 Mc. from Mt. Katahdin in Maine, back in 1941.

More amateur TV stations coming up. This month we report TV activity by W9QGZ, Chicago, and W5OMG, Shreveport, La. W9QGZ began operation in March with a flying-spot scan-



Standings as of April 25th

W0ZJB.....48	W5VY.....47	W9ZHB.....48
W0BJV.....48	W5GNQ.....46	W9QUV.....48
W0CJS.....48	W5JTI.....44	W9HGE.....47
W5AJG.....48	W5ONS.....44	W9PK.....47
W9ZHL.....48	W5ML.....44	W9VZP.....47
W9NJT.....48	W5JLY.....43	W9ALU.....46
W6OB.....48	W5JME.....43	W9QKM.....46
	W5VY.....42	W9RQM.....45
W1CLS.....46	W5FAL.....41	W9UIA.....45
W1HDQ.....46	W5NHD.....41	W9UNS.....42
W1CGY.....45	W5FSC.....41	
W1LLL.....44	W5HLD.....40	W0QIN.....47
W1KHL.....43	W5HEZ.....35	W0DZM.....47
W1HMS.....43		W0NFM.....47
W1LSN.....41	W6WNN.....48	W0INI.....47
W1EIO.....40	W6UXN.....47	W0TKX.....47
	W6IWS.....41	W0KYF.....44
W2RLV.....45	W6OVK.....40	W0JOL.....44
W2BYM.....44	W6TMI.....40	W0JHS.....43
W2IDZ.....43		W0PKD.....43
W2AMJ.....42	W7HEA.....47	W0HVW.....42
W2MEU.....42	W7ERA.....47	W0MVG.....41
W2GYV.....40	W7BQX.....45	W0PLI.....41
W2QVH.....38	W7DYD.....45	
W2FJH.....37	W7JRG.....42	VE3ANY.....42
	W7BQC.....40	VE3AET.....32
W3OJU.....45	W7JPA.....40	VE1QZ.....32
W3NKM.....41	W7FIV.....40	VE1QY.....31
W3JVI.....38	W7CAM.....40	HC2OT.....26
	W7KFM.....40	XE1GE.....19
W4FBH.....46	W7ACD.....35	
W4EQM.....44		
W4QN.....42	W8NQD.....42	
W4FWH.....42	W8YLS.....41	
W4CPZ.....39	W8CMS.....41	
W4OXC.....39	W8LBH.....38	
W4MS.....39	W8RFW.....37	
W4BEN.....35	W8UZ.....37	
W4FNR.....35	W8WSE.....36	

Calls in bold-face are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.

ner and the r.f. portions of an APS-13 for transmission and reception. A crystal-controlled transmitter is in the works. Details of W5OMG's gear have not yet been received as we write.

In connection with the RSGB National Convention in London, June 22nd to 24th, the British Amateur Television Club (G3CVO secretary) will hold a meeting at the Cinematograph Exhibitors Association, 164 Shaftesbury Ave., London WC2, on June 23rd.

Spring V.H.F. Party, June 9th and 10th

All set for the big week end? Year-round regulars or summer DX hounds—everybody gets into this one. Many club groups will be giving their Field Day set-ups a trial run from choice mountain-top locations. It's June, and that means anything can happen propagationwise, but whatever comes up there's bound to be fun for all. This week end is a must for every v.h.f. man. Write Hq now for those contest forms to make your reporting as simple as keeping a log. See page 52 of this issue for the simple rules.

M.A.R.S.

Pacific Report

MARS is expected to play an important part in the Hawaiian civil defense program, according to Pacific MARS Director James A. Long, AB6ACB.

At a recent meeting of the Executive Committee for Communications, Disaster Relief Agency, Territory of Hawaii, Captain Long reports preliminary plans for formulation of a communications network were discussed. At that time tentative plans were outlined for a two-network system, one to operate on 160 meters (1990 kc.) and the other in the 75-meter band.

AB6OO has been appointed MARS representative to the network, and is equipped to work either of the proposed nets. AB6USA will tie in with AB6OO to receive traffic and place it into the various MARS nets, if needed.

Other Island developments include activation of a new network on 14,405 kc. The net meets Thursdays at 0500Z. Another net is contemplated to operate on 20,994 kc. Captain Long stated that last year this frequency was still usable when "ten" was out. If enough stations are interested and have equipment to operate on this frequency the nets will be activated this summer.

The MARS USARPAC QSO contest of 31 March went off according to schedule, although participation was not as great as had been anticipated. Island stations heard or worked by AB6USA included AB6s ABR UV AAQ WAB MT AAT AGF FX NFH and AAG.

A few stations worked 3, 6, 14, 20 and 27 Mc., but most confined their operations to one or two bands. Stateside stations reported by AB6USA were WAR, A2USA, A6KKH, A7BEG, A9USA, and A5WAR. One choice piece of DX worked was AB6KL, Palmyra Island.



Members of the Schofield Net pose for a group picture during the USARPAC MARS-fest 24 March. *Kneeling:* J. Reynolds, AB6NDT; M. L. Monson, A7GNN; W. J. Koccon, AB6ADK; I. T. Jeffrey, AB6AGF. *Standing:* J. D. Brayton, AB6NFH; G. W. Baxter, AB5KVS; J. W. Dunwoody, AB6ADZ; G. H. Grisard, AB6AEC; T. W. MacClure, AB6AAY; J. A. Long, AB6ACB; G. J. Collins, AB6WS.

Preview - DX Contest High Phone Scores

FOLLOWING is a compilation of claimed high scores in the 'phone section of the 1951 ARRL International DX Competition. The final outcome may be changed after careful checking, but this listing will give an idea as to how the completed analysis will appear.

Highest claimed score for each of the W and VE call areas: W1ATE 166,763, W2OFJ 68,105, W3BES 140,589, W4DCQ 177,237, W5JUF 11,515, W6HX 94,424, W7DL 35,820, W8HRV 90,289, W9RBI 70,982, W0PRZ 67,492, VE1RR 19,614, VE2ADB 19,320, VE3AUJ 34,560, VE4RO 26,325, VE7VO 20,280. High contact totals: W1ATE 425, W4DCQ 419, W4ESK 418, W3BES 369, W6HX 359, W3LTU 326, W4KWY 318, W3DOE 317, W3DHM 302, W6PWR 300, W6ITY 280, W8HRV 271, W0PRZ 260, W2OFJ 239, W8REU 237, W9RBI 232, W7DL 199. Top multipliers: W4DCQ 141, W1ATE 131, W4ESK 129, W3BES 127, W3DHM 125, W4KWY 117, W3LTU 114, W3DOE 113, W9RBI 102, W8REU 101, W8HRV 99, W2OFJ 95, W0PRZ 94, W1BIB 90.

Outside W/VE, the following submitted highest claimed scores from their respective countries: HC2OS 109,620, KH6IJ 95,634, VP7NH 75,809, LU5AD 65,736, KZ5NM 42,330, KL7NXI 40,640, KP4DU 38,571, 11US 33,453, CN8EP 26,510, TI2TG 26,244, CT1PK 20,566. Top reported contact totals: LU5AD 708, KH6IJ 693, VP7NH 636, HC2OS 610, KH6MG 580, KZ5NM 420, CN8EP 405, 11US 400, KL7NXI 341, KP4DU 299. High multipliers: HC2OS 60, KH6IJ 46, KH6MG 46, KP4DU 43, VP7NH 43, KL7NXI 40, KP4KD 38, TI2TG 36, KZ5NM 34, LU5AD 33.

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

W1AWX, George P. Bent, jr., Hyde Park, Mass.
W1BYC, Howard Hawkins, West Lebanon, N. H.
W1GPU-K1NAA, Robert P. Read, Saunderson, R. I.
W2ITA, Anthony K. Wheeler, Owego, N. Y.
W2TFQ, James T. Miller, sr., Utica, N. Y.
W2YLK, Joseph A. Del Carlo, New York, N. Y.
W4AAK, Martin E. Mann, Fayetteville, N. C.
W4AB, Ernest T. Luscombe, Fort Lauderdale, Fla.
W5ECO, ex-W0CCW, William J. Houlihan, New Orleans, La.
W6LOL, Leo D. Carroll, San Diego, Calif.
W6YEH, Minor Tiller, San Francisco, Calif.
W7SK, Glenn H. Dann, Winant, Ore.
W8AAM, Ira J. Ocha, Marquette, Mich.
W8RWE, Orville J. LaBeau, Wyandotte, Mich.
W9LUZ, Louis S. Parre, Hammond, Ind.
W0ETS, Wallace E. Boyle, Goodland, Kans.
W0LZT, Leif N. Larson, Willmar, Minn.
G3BGS, R. H. F. Gammons, Kidlington, Oxfordshire
G5WY, Charles Leonard Wood, Exeter, Devonshire
VE1QM, Fred E. Nafel, Halifax, N. S.



How's DX?



CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

This may be as bad a time as any to record for posterity a bit of data anent the hopes, trials, tribulations and frustrations of the average DX man circa 1951. This year, you know, opened the last half of the century and somebody might want to bury this month's pillar in a time capsule for the eventual perusal of DX men in some distant era. [No, Boss, just bury, period. — Jeeves] By that time even TVI may have been met and conquered without fuss, possibly through use of pure sine-wave amplifiers and oscillators operating Class D₁.

We believe Mr. Average may be assumed to be wending tortuously upward toward the 200-country mark and we undoubtedly would find him equipped with some sort of rotary beam, probably with three elements, the tuning and feeding of which he will never be fully satisfied with. If he doesn't already possess a dual-conversion superhet he's saving his pesos for one. Due to the extreme availability of many neat little commercial excitors, his home-building is limited to the final amplifier stage and TVI preventative paraphernalia associated therewith. Where space allows he often has more than one final stage to facilitate band change and also an extra receiver with which to keep his ear on a QRL rare one.

His QSL file isn't a thing of outward beauty, most likely a shoebox combo, but its weight therein is treasure worth more than its weight in uranium. He long since ran out of wall space for the proper display of his trophies.

Though he swears once or twice a year never to become embroiled in another "rat race," the next DX contest will find his poor family faced with the back of his head as usual. And at such times it will be his unalterable opinion that conditions are never quite up to par.

The foul presence or boasted absence of TVI makes up a major portion of his conversation and his knowledge of filter network theory and distortion-wave products is of necessity growing by leaps and bounds. (The leaps and bounds when the telephone rings.)

All but his closest lay friends believe he may be sometimes slightly screwloose; said closest friends are sure of it. But he wends his merry way having fun, doing a good job and, when conditions are poor enough to give him time, writing needling postcards to DX editors who appreciate them very much.

What:

Twenty has been erupting on occasions in the fashion that has made it so famous. W3JYS agrees: CR5e AA (14,080) AD (14,078), CS3AA (14,061), DU1VVS (14,048), EA9AP

* DX Editor, QST. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

(14,032), GC3EML (14,095), HRIKS (14,075), IS1CNQ (14,080), IS1FIC (14,070), IT1SEM (14,070), JAs 2KW (14,035) 4AG (14,038), TG9CR (14,042), VQ2C (14,065), VS8e AC (14,095) BA (14,067) and BP (14,077). Folded dipoles aren't yet quite obsolete! . . . W2AQE/KM6 (14,031 18) came back to W7JYZ and W7VY romped off with VT1AF (14,071) and KJ6AI (14,020). . . . VK1RB (14,068), VRs 1C (14,111) 2BZ (14,022), VP3VN (14,090), VU2JP (14,032), VU2JG (14,090), VK9GB (14,012), VSs 6AC (14,085) 7NG (14,090), DU2 1J1 (14,100) 1CE (14,100) 1GT (14,093) 6IV (14,106), UA2 90A (14,050) 9KFB (14,032) 9KSB (14,012), 3V8AN (14,006), TP3MB (14,030), FQ8AC (14,038), GD3FBS (14,053), JAs 2FM (14,090) 4CR (14,068), OX3s UD (14,116) EG (14,070), ZE4JE (14,010) and KW6AR fatted up the W9HUZ log considerably. Van has the gadabout FC2AT opined as an MM job. . . . W6NTR was glad to nail VP3FD on Reunion, TA3FAS (14,080), ZM6AK (14,008), VR2CG (14,057), FKA8H (14,080) and the aforementioned FQ8AC. . . . MD2BC (14,075) raised W1APU's morale and W8BL8 was intrigued by LB5Q's prefix. . . . Easing up on 80-meter traffic for the moment, W2CWK podnest upon 3A2AC (14,015). . . . 9S4AX (14,000) worked W8OCA and W9KA's postwar DXCC was well-earned with an input of not over 60 watts. . . . The vertical at W9NN knocked off the FP8 twins, VQ4BB, one FG8AB, FFBAC and an FQ8 while W9BAF sampled PZ1QM (14,110), PZ1AL (14,090), EABRE (14,080), ZS3K (14,080), ZS3Q (14,010), CT3AA (14,080), UA6VB (14,075) and VS6BN (14,090). . . . 9S4AL (14,000), GC2FMV (14,064), ZD2JAB (14,010), EL2P (14,054), ZB2I (14,060), MB9BJ (14,006) and TF3KG (14,025) worked W2JBL. . . . XE1AC has trouble finding Us on voice but makes it a cinch on c.w.: UA1KAI (14,080), UB5KAO (14,090), UC2KAB (14,098), UD6AH (14,094), UP6AC (14,070) and UN1AE (14,101). Al also found available M13VG (14,078), SV9WV (14,092), JAZMM (14,087) and KR6FK (14,085). . . . FS8EX/AR (14,016), OY3IGO (14,090), FR7ZA, UA8SJH, HZ1KE, 4XARE, CR7CI and sads of Z8s were pleased to encounter W7VY which puts Gene up around 220 worked. . . . W2WG landed some nice ones including ZE2JS, ET3A, IS2C, F9JD/FC in Corsica, CT2BO and C8AAD while W2CTO collected EA6AF, FQ8AF, CP5EK, TA3AA, VP8AK, JAs 2KW and 7WH. . . . CZAP was W6ALQ's





Ferdinando Di Paola, IS1FIC, at the controls of his well-known Sardinian station. The transmitter is a 100-watt homebuilt affair for 10, 20 and 40 meters.

first postwar C in addition to YS10, VK1YM, HP1BR, KH6ACL/KP6, UA9s FR and KKB. Max reports a swift airmail card from KC6WC.....VQ5AU (14,080), FQ8AE, FFA8B, EK1AQ, CR5AC, CR7BB and VP1AA adorn W9GMZ's ledger and Paul would like to borrow neighbor W9KOK's Tibet-oriented rhombic for the purpose of collecting Asian customers.....FQ8AA, ZD2DYM, TF3BG and others previously notated were raised by W5JUF and W9FID's clockwork goes like this (CST): YN1AA (1616), OA4BR (1634), ZE3JP (1715), TF3BG (1725), YS10 (0857), VP1AA (1612) 5BM (1127) 6PV (0746) 7NM (1151) 8AK (2000) 9D (1834), CX6AD (1800), ZS3Q (1515), ZE3JP (1715), HC2KB (0730), CT3AB (1956), CN8EJ (1209), OX38F (1144) and T12DL (0707).....4X4DK (14,058) came back to W5FCO.

FP8AW and VP5BP lived things up on *twenty* 'phone, one or both being worked by XE1AC, W2AEB, W9FDX, W5JUF and many others. VP5BP emanated from the Caymans.....W5JUF caught some dandy voices: KH6LB/KW6, KJ6FAA, KC6WC, ZK2AA, ZM6AA EA9AB, VK9YT, FG7XA, ZD6s HJ RD and F88AA. Looks like a must for A3 in order to snag those last two countries at present.....C3KK (14,220) is recommended by JA2CS.....W2AEB adds VP7NH (14,160) and is another 10-meter man driven by conditions to the lower band.

Wringing out and stomping upon the mailbag three or four times didn't produce enough *ten-meter* reports around which to build a self-respecting paragraph. However, the Jersey twins are still scraping 'em up. W2AEB specifies QSOs with CR6AQ, ZD4AH, CX4AB, YV1AU, ZL 1CD and 2BN, 3V8BA (who Q8Ls but fast), ZD2DYM, EA8AX and FG7XA.....W2ZVS managed HH1HB, VP1BOY 2GX 28E, ZPs 3AW 5IB, YN4VN, CR6AQ, KG4AQ, OQ5BQ, CP4DG, VK2TG, ZL 3FX 4DC, ZS3S, EA7BB and a substantial helping of Z8s-proper.....W9FID showed up for HR1RL and W9FDX worked FQ8AF.....W0CKC's 350-wattter enabled him to join the club with VP6s FO 8D, YS10, HC2s GRC OS, VK2AFE, HR2JM, ZS9F, VQ4SGC and mucho LUs and PYs. Oh, yes, W0CKC and W2ZVS didn't miss FG7XA. What's more, the W9 has confounded the experts by actually working somebody on 10 c.w.: FF8JC, VP9F, YS10Y, HP1BR and more LUs.

Better night openings on 14 Mc. have lowered the pressure on *forty* but good stuff is still there. W8YGR and many others report on FP8BX (7012) and FG7XA appeared to pep things up.....TF3MB (7015), ZS5LU (7033) and ZS6UO (7039) worked W9HUZ and W7MQY lingered for FY7YC (7025), FK8AB (7008) and DU1MB. Doug's BC-459 is now up to 54 7-Mc. countries — not bad from

W7.....W2WWP found that EK1DX (7008) runs 75 watts to a 1000-foot-per-leg diamond. Clark also scored with HZ1KE (7008), YS10 (7024), ZE3JP (7008), VP7NM (7009), HP1BR (7020), ZS5U (7010), ZS5LZ (7008) and FK8AZ (7020). 85 40-meter countries have been raised at W2WWP.....VP5s HL (7020) BM (7010), VO6H (7010), OX3UE (7004) and HR1AT (7030) answered W4QCW while W2YVQ encountered FP8AW (7060).....W0DAZ made his first investigation of the 7-Mc. DX situation and surprised himself with a solid OZAKT QSO.....At W2WC we find VP8AP, EA9AF, ZE3JP, F88AC, FF8JC and 4X4RE. In addition, Frank reports a 1700 EST longpath job with VK5FH. He swears by his Brooklyn-grown ground-plane vertical and runs 125 watts.....VP4LZ, VP5BF, VQ3CF, F9JD/FC in Corsica, ZK1AB, CR7CI, IT1FV, YU1CAG, FA8DA, OX3BG and other goodies make up the bag of W9ESQ.....30 watts to a pi-section-fed 15-foot-high 60-foot wire lead W4BHG to the capture of CT1JL, T12PZ, K84AC, FA8CR, HP1BR, EK1AO, FG8AA and an FP8.....In the So. Calif. DX Club's *Bulletin* we spot W6GAL's list of 7-Mc. prizes: VS7NX (7024) at 0720 PST, VK9MR (7030) 0115, ZS7D (7029) 0805, ZD9AA (7028) 2340, VP1AA (7000) 1740, UC2KAB (7035) 0655, UA9FP (7033) 0828, KH6ACL/KP6 (7025) 2330, CR7AG (7034) 0828, CX1FY (7012) 0130, OH7NF (7035) 1935 and the FP8s previously mentioned. Those were worked and these were heard: UA1KAI (7067) 0715, UBSKAA (7028) 0710, UF6AC (7049) 0705, YU3AGH (7001) 2005, EA8CL (7029) 0105, MP4BAF (7035) 0715, TF3MB (7015) 1945 and sundry European 3Ts.

On *eighty*, ZL 1DI 1CI 1BY 1HM 3JT 4BO 4DU and ZM6AK succumbed to W7OHX/6 while W7CWN's 40 watts pilfered contacts with HP1BR and KH6DK.....W2ESO and W2CWK landed ZD4AB.....The 50-wattter of VE1JD made quick work of PY7WS, T12PZ and ZD4AB, all between 3500 and 3511 kc.....HZ1KE (3504) and FP8AW brought W4KFC up to 77 80-meter countries and W1BOD worked 4X4RE, SV9WH and CN8EJ.....W2WC raised the 4X4 and PY7 mentioned as well as ZLs DU and GM.

On *one-sixty*, VE1EA now has 10 countries in four continents and still seeks Oceania and South America for his 160 WAC.....W4NNN/6 brings to our attention that he had a 1950 DX Test 1.8-Mc. QSO with HC1PK. This challenges W1BB's HC1JW contact as the first U. S./S. A. low-band QSO and we'll check further in this regard.....EK1AO (1788), GWs 3ZV (1795), 3FSP (1793) and KV4AA (1997) contacts are mentioned by W4KFC.....W1LYV nailed GW3ZV on two-way 'phone and worked GD3UB, EK1AO and some dozen Gs on c.w. Larry runs 60 watts into a 160-meter long wire. That's what we said, brother — it's two full wavelengths long, or 1020 footies. Next season W1LYV will be sporting an *eight-wavelength* wire for this band; you can figure out the physical dimensions yourself if you have the time.

Where:

With DX chasing somewhat more fruitful of late than for a long period heretofore, the QTH market tends toward the boomish side. But we can always use more of 'em; (Continued on page 116)



HH2DJ, W1PST, HH2X and HH2LD got together in Port-au-Prince during W1PST's recent Caribbean cruise.



Correspondence From Members -

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

DOCKET 9295

2902 Collins Ave., Silver Spring, Md.

Editor, *QST*:

After reading over the new amateur regulations recently enacted by the FCC, I (and I hope many other amateurs) became aroused at the negligible effect the informal conference held in November, 1949, and the oral argument of June, 1950, had in amending the original draft of Docket 9295. More alarming is the apparent open hostility which the majority of the Commission holds against the opinions expressed by the dissenting Commissioners. In the whole order, this statement of the dissenting Commissioners contains the only expression of understanding and honest consideration for past and future amateurs and amateur radio. What manner of further autocratic regulation may be expected from a Commission majority which disagrees with these views?

It is quite evident that these new rules do not represent the desires of most amateurs, in spite of the ignominious effort by the Commission to establish this as a fact in the report. This is conspicuously true because the provisions pertaining to renewals and the Extra Class license represent the extreme, rather than the mean, of amateur opinion. Likewise revealing is the excess verbiage they found necessary in a futile effort to belittle, refute and dispose of the adverse arguments presented at these hearings.

In the face of stern opposition by amateur representatives, the Commission dogmatically dictates the limits and functioning of a "healthy amateur radio service." Under these circumstances, what constitutes the public interest is certainly vague! Apparently, by employing the guise of acting in the public interest, the Commission can in fact do no wrong, and may impose whatever measures it chooses. Is this the American way? If the Commission feels compelled to exercise its "positive responsibility to regulate the use of radio in the public interest," under the Communications Act, why better can't it act in a positive way to protect the rights of amateurs who comply with FCC regulations and yet must stay off the air because their neighbors don't choose to cooperate? I and many other amateurs have had bitter experience in this instance and, therefore, know that a lot of needless ill-feeling could have been easily avoided if the FCC field office had taken other than passive action on our reports.

What should be done is to again confront the FCC with the expressed desires of amateurs concerning regulations for this service. As a matter of simple rationality we should select the best possible medium to do this. I do hope the ARRL will act in accord with and pursue known amateur wishes, the personal interests of directors and staff notwithstanding, as it is the largest and most influential of amateur organizations. Obviously, we should take an interest in keeping our respective division directors cognizant of what we believe appropriate in the way of regulations. I am also convinced that the League has a corollary responsibility to devise methods of extracting the opinion of noncommittal or complacent amateurs — members or not. Voting members should also be afforded a brief statement of policy on the platform of candidates for League elections; carefully worded to enable a simple selection of preference. Acting in this manner there is still hope that more suitable regulations, based on the concerted opinion of amateurs, will eventually be enacted; in conformance to an important principle of American government — "that government derives its just powers from the consent of the governed."

— D. O. Mann, W5MBY

726 Kellogg St., Green Bay, Wis.

Editor, *QST*:

I have just completed reading your editorial on Docket 9295 in the April issue of *QST*. Both you and ARRL are to be congratulated.

The proposed action, and argument, make a lot of good common "horse sense" and prove to me that the League will still fight for the individual amateur.

Thanks for a job well done.

— Jerry Van, W9VOW

1050 Shipping St., Salem, Ore.

Editor, *QST*:

Please accept my compliments on your action to modify the recent action of FCC relative to the Extra Class amateur license.

I have been an amateur for quite a few years, and have also been a trustee for club stations in schools and colleges for about the same number of years. During all this time I can truthfully say that any aspiration to obtain a high code speed has not contributed anything to my growth as an amateur. Any growth I have made has been due to my desire to put out a good clean modulated signal such that my amateur friends enjoy visiting me over the air.

If FCC has any motives for the increase of interest in c.w. signals, they should assign a small segment of the spectrum for high-speed code. I am sure it need only be small and I am also sure that no one will try to QRM them.

I wish you success in your endeavor to help FCC see the light.

— C. R. Lindstrom, W7KHY

Hadley, Pa.

Editor, *QST*:

The FCC has proposed another license, Amateur Extra Class. This irks me very much, for certainly those of us who have been around here for many years and have proved to the FCC that we can copy the required code and passed several examinations will again be required to pass some more examinations to operate in bands which we have operated in for many years. It looks very much to me that they wish to place hardships on the old-timers. I have no doubt that I can copy the 20 words per minute but I have developed what is known among us RR operators as operator's paralysis and my pencil just will not work as my mind would wish it to do.

Certainly I am in favor of restrictions, but I also do not think it fair to place these on those of us who have been around as long as many of us have.

— R. A. Onie, W3AAT

Rt. 1, Waterloo, Ill.

Editor, *QST*:

Why not let well enough alone? The FCC could have wiped out Class A entirely! Then everybody would have to pass the Extra Class exam. To ask Extra Class "privileges" for Class A without passing the test is pure greed. It seems to me that the "Advanced Class" is the grandfather clause you want so badly. Let's face it — the requirements have been raised, and if the present Class A man feels that he has been dropped a notch, let him prove his ability. I am grateful to the League for its efforts in my behalf and I am glad that I won't have to pass the Extra Class exam to retain my Class A privileges.

I doubt very much if the FCC can offer any "Extra privileges" that will tempt me to copy 20 w.p.m., but if they should I would want to earn those privileges fairly — not demand them on the basis of past fame and glory. Why not wake up and be thankful that we got such a fair deal? I feel sorry for the later General Class men who will have to copy 20 w.p.m. c.w. to get 20- and 75-meter 'phone privileges.

— Eugene L. McMurtry, W8ICF

[Editor's Note: As reported on page 40 of this issue, ARRL's request for reargument was turned down by FCC.]

A Low-Drain 2-Meter Mobile Transmitter

A Practical Design for the 100-Ma. Power Supply

BY EDWARD P. TILTON,* W1HDP

THE SCR-522 transmitter and the PE-103 dynamotor have their uses, but either one is too rough on the power source to be of much value in 144-Mc. mobile communication of the type needed in civil emergency work. Our primary requirement here is for a transmitter of moderate power that can be used for many hours without fear of running the car battery down. If, in the process of achieving this aim, we come up with a design that is a few decibels below the maximum power that can be run from a battery source, it will make very little difference in our effectiveness for the job at hand.

The little transmitter shown here can be operated from a 200-volt source capable of supplying 100 ma. d.c. This may well be a small vibrator or generator supply that is also used on the receiver. The r.f. section draws only 60 to 65 ma., leaving ample current for the modulator. With a 200-volt 100-ma. vibrator supply this means a total drain from the storage battery, heaters and all, of around 8 amperes. The output will be about half that usually obtained from a 522, with a fifth of the power drain and about one-tenth the physical space.

Maximum economy is attained through the use of a multipurpose overtone crystal oscillator-multiplier circuit described in detail in April *QST*.¹ A 24-Mc. crystal is made to oscillate on its ninth overtone, 72 Mc., instead of its third, the second half of the 12AT7 dual triode doubling to 144 Mc. This drives a pair of 6AK5s in push-pull as a

final stage. Though the power can be run considerably higher without injuring the 6AK5s, they are usually operated at a plate input of around 5 watts. This is enough power to handle most mobile assignments satisfactorily. The unit might also be used as a driver for an 829B or similar stage of up to about 80 watts input.

The transmitter is built on a folded aluminum chassis $3\frac{1}{2}$ inches wide, 7 inches long and $1\frac{1}{2}$ inches high, with $\frac{1}{4}$ -inch edges bent over on either side. The form factor is such that the unit may be mounted in a number of ways in any available space around the car. A modulator may be added if a slightly larger chassis is used, or it could be a separate unit to be placed as space requirements in the car may dictate.

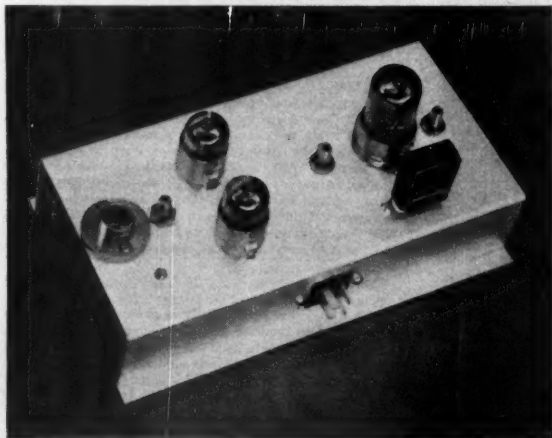
The circuits are somewhat unusual, but adjustment is neither difficult nor tricky once their functions are understood. A calibrated grid-dip meter will be a great aid, but the work can be done without such an instrument readily enough. In the oscillator circuit, L_1 and C_1 resonate at the overtone desired; in this case 72 Mc. L_1 is the larger of the two coils appearing at the lower left of the bottom-view photograph. L_2 is resonated at a frequency somewhat lower than the desired overtone, or about 68 Mc. This is checked with the crystal in the socket, the turn spacing of L_2 being adjusted for this purpose.

The second half of the oscillator circuit (this oscillator requires two tubes, or a dual triode) also serves as a frequency doubler. Its plate circuit is split-stator tuned to give balanced coupling to the push-pull amplifier. C_6 is a small mica trimmer used for regeneration control in the doubler. It is operated near minimum capacitance.

The trimmer used to resonate the screen circuit of the 6AK5s may or may not be needed; in our first "rats' nest" model, the amplifier was completely stable with a single 100- μ fd. disc ceramic by-pass for the two screen terminals. As is often the case, when the circuit was "cleaned up" and mounted on an aluminum chassis, the amplifier was unstable until the screen circuit shown in Fig. 1 was installed. The two screen terminals are tied together, and each one individually

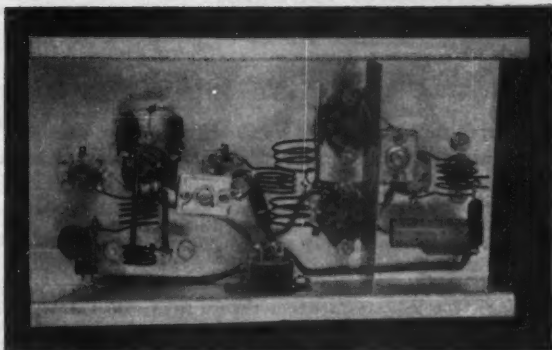
* V.H.F. Editor, *QST*.

¹ "Overtone Crystal Oscillator Circuits," April, 1951, *QST*, page 56.



Top view of the low-powered 2-meter mobile transmitter.

Bottom view of the 2-meter transmitter. The oscillator-multiplier components appear at the left. At the right are the two 6AK5 sockets, with a copper shield for isolating the grid and plate circuits.



by-passed. Then a mica trimmer is connected from one screen terminal to ground. Note also that both cathode terminals on both 6AK5s are grounded. A small shield of flashing copper isolates the grid and plate circuits.

Adjustment

In placing the unit in operation the 12AT7 stages should be checked first, with no plate or screen voltage on the 6AK5s. With about 150 volts on the 12AT7 there is little chance of damaging the tube. If the layout follows that shown in the photographs and the coils are made according to the information in the parts list, there should be little trouble in tuning the rig. Be sure that the Pin 3 end of L_2 is adjacent to the

cold end of L_1 . The two coils should be about $\frac{1}{4}$ inch apart.

Set the trimmer C_4 at minimum capacitance and apply plate voltage through R_1 and R_2 . Check for oscillation as indicated by a change in plate current when C_1 is rotated. The indication should be similar to any other crystal oscillator: it will pop into oscillation as resonance is approached, kicking out again as it is passed. Listen to the note on 72 or 144 Mc. to see if it is

(Continued on page 122)

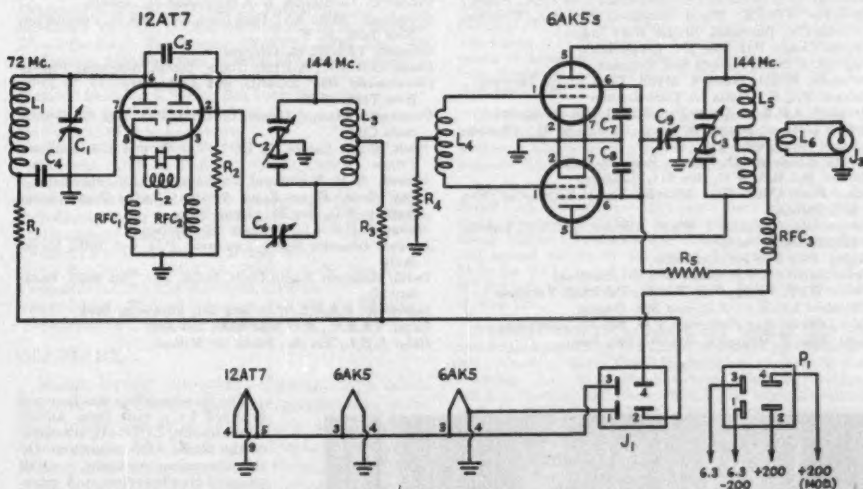


Fig. 1 — Schematic diagram of the low-powered 2-meter transmitter.

- C_1 — 20- μ fd. miniature variable (Johnson 160-102).
 - C_2, C_3 — 5- μ fd. miniature butterfly variable (Johnson 160-205).
 - C_4 — 0.001- μ fd. disc ceramic.
 - C_5 — 5- μ fd. ceramic.
 - C_6, C_7 — 3-30 μ fd. mica or ceramic trimmer.
 - C_8 — 47- μ fd. disc ceramic.
 - R_1, R_2 — 2200 ohms, 1 watt.
 - R_3 — 6800 ohms, $\frac{1}{2}$ watt.
 - R_4 — 8200 ohms, $\frac{1}{2}$ watt.
 - R_5 — 10,000 ohms, 5 watts.
 - L_1 — 5 turns No. 18 enam., $\frac{1}{2}$ -inch diam., $\frac{1}{2}$ inch long.
 - L_2 — 4 turns No. 18 enam., $\frac{1}{2}$ -inch diam., $\frac{1}{2}$ inch long.
- Cold end of L_1 is adjacent to Pin 3 end of L_2 , with about $\frac{1}{4}$ -inch space between the two coils.

- L_3 — 4 turns No. 18 enam., $\frac{1}{2}$ -inch diam., $\frac{1}{2}$ inch long, center-tapped.
- L_4 — 3 turns each side of center tap, No. 18 enam., turns spaced $\frac{1}{8}$ inch. Leave $\frac{1}{2}$ -inch space at center for L_3 .
- L_5 — 5 turns No. 18 enam., $\frac{1}{2}$ -inch diam., $\frac{1}{2}$ inch long, center-tapped.
- L_6 — 2 turns No. 18 enam., $\frac{1}{2}$ -inch diam., coupled to L_5 . Use Formvar wire for L_5 and L_6 if available.
- J_1 — 4-prong male chassis fitting (Jones P-304-AB).
- J_2 — Coaxial socket (Jones S-201).
- P_1 — 4-prong female plug, cable clamp type (Jones S-304-CT).
- RFC_1, RFC_2 — 50- μ h. r.f. choke (National R-33).
- RFC_3 — Solenoid v.h.f. choke (Ohmrite Z-144).

I.A.R.U. News

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Guantanamo Bay: KG4AD, Box 35Q, Navy 115, % FPO,

New York, N. Y.

Guatemala: Manuel Gomez de Leon, P.O. Box 12, Guatemala City

Haiti: Roger Lanois, % RCA, P.O. Box A-153, Port-au-Prince

Hawaii: A. H. Fuchikami, 2543 Nanea Dr., Honolulu

Hong Kong: Hong Kong Amateur Radio Transmitting

Society, P.O. Box 541, Hong Kong

Hungary: H.S.R.L., Postbox 185, Budapest 4

Iceland: Ialenskir Radio Amatörar, P.O. Box 1080, Reykjavik

India: Amateur Radio Club, India, P.O. Box 6666, Bombay 20

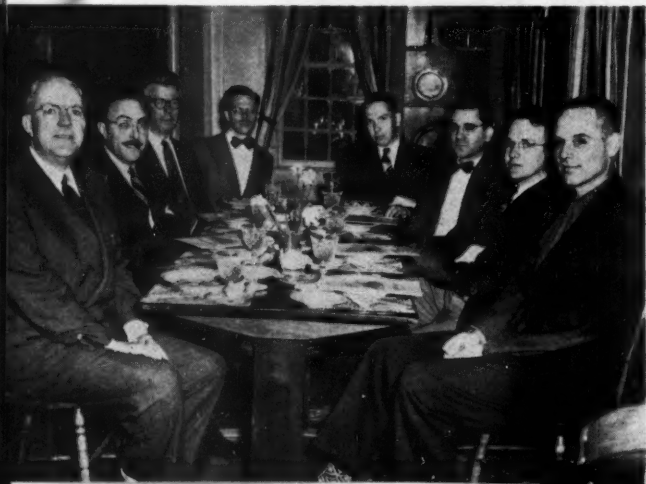
Indonesia: P.A.R.I., P.O. Box 222, Surabaya, Java

Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv

Italy: A.R.I., Via San Paolo 10, Milano

The Headquarters was honored in April by a visit from Adolfo Glucksmann, LU3BAC, treasurer of the Radio Club Argentino. On this auspicious occasion, a small group of Headquarters staff members entertained Senior Glucksmann at a luncheon party. *L. to r.:* David H. Houghton, ARRL treasurer, Sr. Glucksmann, A. L. Budlong, WIBUD, IARU secretary, John Huntoon, W1LVQ, IARU senior assistant secretary, George Hart, WINJM, ARRL national emergency coordinator, Joseph A. Moskey, W1JMY, ARRL deputy communications manager, Richard L. Baldwin, W1IKE, IARU assistant secretary, and Byron Goodman, W1DX, QST assistant technical editor. The IARU officials hold similar positions in the ARRL organization.

QST for



Jamaica: Thomas Meyers, 122 Tower St., Kingston
Japan: F.E.A.R.L., APO 500, % Postmaster, San Francisco, Calif.

Kuwait: Doug Taylor, VTIAC, Box 54, Kuwait, Persian Gulf

Libya: See Tripolitania

Luxembourg: W. Berger, 40 rue Treviere, Luxembourg

Macao: Via Hong Kong

Madeira: Alberto C. de Oliveira, CT3AA, Beco Chao da Loba, 4, Funchal

Malta: R. P. Galea, 20, Collegiate Street, Birkirkara

Mauritius: V. de Robillard, Box 155, Port Louis

Mexico: L.M.R.E., Apartado Postal 907, Mexico, D.F.

Montserrat: VP2MY, Plymouth

Morocco: C. Grangier, Box 50, Casablanca

Morocco: Tangier International Zone only: EK1MD, Box 57, British Postoffice, Tangier

Mozambique: Liga dos Radio-Emissores, P.O. Box 812, Lourenco Marques

Netherlands: V.E.R.O.N., Postbox 400, Rotterdam

Netherlands East Indies: Hr. C. Looze, PK1LZ, Burg. Kührweg, 47 Bandoeng, Java

Newfoundland: N.A.R.A., Box 660, St. Johns

New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington C1

Nicaragua: L. B. Santes, Bolivar Ave., 106 Managua

Northern Rhodesia: N.R.A.R.S., P.O. Box 199, Livingstone

Norway: N.R.R.L., P.O. Box 898, Oslo

Pakistan: P.O. Box 416, Lahore

Panama, Republic of: L.P.R.A., P.O. Box 1616, Panama

Paraguay: R.C.P., Palma 310, Asuncion

Peru: R.C.P., Box 538, Lima

Philippine Islands: Elpidio G. DeCastro, Philippine Amateur Radio Assn., 931 R. Hidalgo St., Quiapo, Manila

Poland: Polski Zwiasek Krotkofalowcow, P.O. Box 320, Warsaw

Portugal: R.E.P., Travessa Nova de S. Domingos, 34-1° Lisbon

Puerto Rico: E. W. Mayer, P.O. Box 1061, San Juan

Roumania: A.R.E.R., P.O. Box 95, Bucharest

Salvador: J. F. Mejia, 7a Calle Poniente No. 76, San Salvador

Siam (Thailand): Frank Speir (W6FUV), Saha Thai, 4th Mansion, Raja Damnoen Avenue, Bangkok, Thailand

South Africa: S.A.R.L., P.O. Box 3037, Capetown

Southern Rhodesia: R.S.S.R., Box 1068, Bulawayo

Spain: U.R.E., P.O. Box 220, Madrid

St. Vincent: VP2SA, Kingstown

Sweden: S.A.A. Stockholm 8

Switzerland: U.S.K.A., Postbox 1203, St. Gallen

Syria: P.O. Box 35, Damascus

Trieste: MF2AA, Major M.H.R. Carragher, HQ V.G. Police

Tripolitania: Peter Keller, MT2DZ, P.O. Box 260, Tripoli, Tripolitania, North Africa

Uruguay: R.C.U., Casilla 37, Montevideo

U.S.S.R.: Central Radio Club, Postbox N-88, Moscow

Venezuela: R.C.V., P.O. Box 2285, Caracas

Yugoslav Islands: Richard Spenceley, Box 403, St. Thomas

Yugoslavia: SAJ, Post Box 48, Belgrade

DENMARK

Minor, though important changes, have taken place in the Danish amateur regulations, with band limits now extended to the greatest possible extent in line with those agreed upon for Region 1 at the IARU Congress held in Paris in May 1950. These were noted in a circular letter sent by the *Experimenterende Danske Radioamatører* to all IARU societies. Briefly, depending upon the class of license, Danish amateurs are permitted up to 380 kc. in the 80-meter band, 200 kc. in the 40-meter band, 400 kc. in the 20-meter band, 1700 kc. in the 10-meter band and 144-146 Mc. Some of the frequencies are on a temporary basis pending final implementation of the Atlantic City table, and some of the frequencies are reserved for radiotelephone operation. EDR officials report a "friendly and understanding" government attitude toward amateur radio.

HAMFEST CALENDAR

CALIFORNIA — Sunday, June 3rd, at Coyote Point, San Mateo — fifth annual hamfest of the San Mateo County Amateur Radio Club. Program starts at 10 a.m., closes at 5 p.m. Transmitter hunts on 2 and 75 meters; also "auction and swap" table. Bring the family and a picnic lunch. Admission free.

CONNECTICUT — Saturday, June 23rd, at Foxon Community Hall & Park, 3 miles east of New Haven on Route 80 — hamfest of the Fort Hale Radio Club. Make plans now to attend.

ILLINOIS — Wednesday, Fourth of July, at the grounds and club house of the Egyptian Radio Club, near Granite City — annual picnic and hambores of ERC. Games, contests, hidden-transmitter hunts. Everyone cordially invited to join the fun.

MISSOURI — Sunday, June 17th, at Tweedie's Camp, near Eldon, Mo., on the Lake of the Ozarks — third annual Missouri Emergency Net picnic. Tickets 50¢ per person. All hams, XYs and YLs invited. Modern cabins and snack bar available. For cabin reservations write Paul M. Cooper, W9TGG, 415 South Maple, Eldon, Mo.

MONTANA — Saturday and Sunday, July 21st and 22nd, at Fish Creek, Glacier National Park — sixteenth annual Glacier-Waterton International Peak Park hamfest. Vacationing hams invited. Cabins, meals, store, gasoline available. For information write Secy. Don Rose, W7IBG, Joplin, Mont.

NEBRASKA — Sunday, June 3rd, at Stanton — Northeast Nebraska Radio Club hamfest. A good time is assured all who attend. Particulars available from SCM Scott E. Davison, W9OED, 433 North Nye Ave., Fremont, Nebr.

NEW YORK CITY — Friday evening, June 8th, at 7 p.m. at historic Fraunce Tavern, Pearl and Broad Sts., downtown Manhattan — dinner of the New York Quarter Century Wireless Association. Program includes several well-known OTs as speakers. Nonmembers may attend as guests of members. Particulars and reservations available from President John DiBlasi, W2FX, 259 West 14th St., New York City.

ONTARIO — Sunday, July 8th, at Brown's Bay (9 miles west of Brockville on the St. Lawrence River in the Thousand Islands area) — hamfest of the Thousand Islands Amateur Radio Assn. Games and bathing. Registration \$1.

PENNSYLVANIA — Saturday, June 16th, at Lake Le Boeuf Park, Waterford — 25th anniversary hamfest of the Radio Association of Erie. Registration starts at 11 a.m., dinner will be served at 4 p.m. Program includes speakers and special events for the ladies. Tickets: \$3 for OM's, \$2.50 for XYs and YLs. Make reservations through Dr. W. R. Cook, 929 State St., Erie, Penna., before the deadline of June 13th.

SASKATCHEWAN — Sunday and Monday, July 1st and 2nd, at Saskatoon — hamfest sponsored by the Saskatoon Amateur Radio Club. Registration starts at 2 p.m. Saturday, June 30th. Headquarters: H.M.C.S. Unicorn, 4th Ave. North at 24th St. Sunday: ARRL meeting presided over by SCM Horn, VE5HR; banquet and program at Club 400. Monday: field day, picnic, general get-together. Special program for ladies and youngsters. Fee: \$5 per couple, \$3 single. Committee will endeavor to arrange accommodations when requested in advance. Write F. Foster, VE5GR, 201 Avenue Bldg., Saskatoon, Sask.

SOUTH DAKOTA — Sunday, June 17th, at Hitchcock Park, Mitchell — hamfest and picnic sponsored by the Mitchell Radio Amateurs' Club. Everyone invited, including XYs, YLs and youngsters. No registration fee. Bring dishes, sandwiches and a pot-luck contribution — MRAC will furnish coffee and ice cream. The Corn Palace will be available in case of rain. Further information available on the S.D. Net or from Coy De Lapp, W9HDO, Longfellow School Bldg., Mitchell, S. D.

VIRGINIA — Sunday, July 1st, at Dickey's Ridge, Skyline Drive, 5 miles from Front Royal — hamfest sponsored by the Shenandoah Valley Amateur Radio Club. Eats, contests, fun for the whole family. Information and reservations available from W4BCT, Reliance, Va.

1951 ARRL Field Day Rules

Annual Test for Emergency-Powered Stations, June 23rd-24th

IF YOU don't have your gear in shape, there's still time to ready it for the 1951 ARRL Field Day. Old hands won't have to be told that the FD packs more solid fun and enjoyment into a week end than any other event in the ARRL Activities Calendar. To newcomers we'd like to explain that this annual activity is a test of emergency-powered stations in the field operating under conditions often approximating those likely to be encountered in an actual emergency. Unlike most other amateur operating activities, this has grown to be largely one in which radio clubs and other organized groups function as teams in setting up and operating single or multi-transmitter stations independently of normal power facilities. It is a spectacular demonstration of amateur radio's ability to provide communications useful in times of emergency. But even if you can't arrange to participate as a member of a Field Day group, you're urged to get into the FD. If you're the proud possessor of a mobile rig, or if you have gear that can be set up afield, get out alone or with a friend and enjoy the fun. You'll find hundreds of stations on the air manned by thousands of brother amateurs eager to hook up with you!

This year the annual ARRL Field Day assumes more importance than ever as a demonstration of amateur radio's ability and willingness to provide communications in emergency. At a time when civil defense organizing, in which amateurs play a prominent part, is getting into high gear, the FD provides an unparalleled opportunity for the mass testing of our emergency communications facilities.

The importance of mobile equipment in planning for emergency perhaps deserves special mention in connection with this Field Day. Mobile operation is more widespread than ever, with club groups and individuals concentrating on getting more and more mobile units on the air. This is an encouraging development, since mobile units are considered indispensable in civil defense planning. All amateurs who possess mobile gear should test it in the FD. Clubs in particular are urged to get every mobile unit owned by their members into the field and to report their aggregate-mobile scores to ARRL.

The procedure used in making Field Day contacts is simple: The general call on c.w. is "CQ FD" and on 'phone "Calling any Field Day station" or "CQ Field Day." During contact give the station you're working a signal report and the name of the ARRL section in which you're located, then stand by to receive similar information. Score your contacts according to the rules listed here and send a report of your FD activities to ARRL Headquarters.

1951 Field Day

Starts 4:00 P.M. Local Standard Time,* June 23rd

Ends 4:00 P.M. Local Standard Time,* June 24th

* Not Daylight Time

The rules covering operation in this Field Day are practically the same as those of last year with three exceptions: First, home stations, formerly grouped under one classification, are now divided into two classifications, those operating on emergency power (Class D), and those operating from commercial power sources (Class E). This is to encourage the testing of emergency-powered gear at home by amateurs who are unable to operate from field locations and will allow them to compare their FD scores with similarly operated stations. Second, the rules now provide that a transmitter used to contact one or more stations may not subsequently be used under more than one other station call during the Field Day period; the effect of this new rule is to prevent the use of a transmitter under several different calls for the purpose of "manufacturing" contacts with a particular station. Third, A2, radioteletype and frequency-shift keying are now grouped for Field Day purposes with A1, in the bands where they are allowed, and all forms of voice transmission are grouped with A3, in the bands where they are permitted.

There is the opportunity to add a substantial number of points to your score for originating a special Field Day message addressed to your SEC or SCM. Study the rules carefully to learn how you may earn this bonus. The FD message is an important part of FD operations: it will give you and other participants practice in handling traffic, and it will convey information to your SEC or SCM that will enable him to evaluate emergency facilities in your section. Don't send your FD message out of your state or League section; normally it should be transmitted to a station in your state or section in order that your SEC or SCM will receive it as soon as possible.

Convenient reporting forms on which to list your FD contacts and make the necessary score computations are available upon request from League Headquarters. You may of course make up your own report forms, but please be certain to include all the information required by the rules. Mail reports on or before July 18th.

It is hoped that all amateurs, especially club and local emergency corps groups, will support the 1951 Field Day and make it the greatest amateur emergency exercise of all time. Start making your preparations now!

Rules

1. **Eligibility:** The Field Day is open to all radio amateurs in the sections listed on page 6 of this issue of QST.

2. **Object:** For portable and mobile stations to work as many stations as possible; for home stations to work as many portable and mobile stations as possible.

3. **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Contest Committee.

4. **Entry Classification:** All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or non-club group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations operating from commercial power sources. Thus a club group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 1C classification.

Portable stations are those installed temporarily, for FD purposes, at sites away from customary fixed-station locations. Portable equipment or units must be placed under one call and the control of one licensee, for one entry. All control locations for equipment operating under one call must lie within a 1000-foot diameter circle.

Club or group participation is that portable-station work accomplished by three or more licensed operators.

Unit or individual participation is that portable-station work accomplished by either one or two licensed operators.

Mobile stations are complete installations including power source and antenna, mounted in or on vehicles and capable of being used while in normal motion. If they utilize antenna supports not normal or suitable for use during motion, installations must be classified as portable instead of mobile. Each mobile entry call must be different from any other FD station participating.

Home-station participation is that work by fixed amateur stations not operating portable or mobile.

A transmitter used to contact one or more stations may not subsequently be used under more than one other station call during the Field Day period.

5. **Field Day Period:** The Field Day starts at 4:00 p.m. Local Standard Time (not Daylight Time) June 23rd and ends at 4:00 p.m. Local Standard Time (not Daylight Time) June 24th. All contacts must be made during this period. Class C stations may cross a time-zone line but may not receive credit for more than 24 hours of operation if they do so.

6. **Bands:** Each 'phone and c.w. band is regarded as a separate band. The following (and additional u.h.f.-a.h.f. bands) constitute separate bands: A1: 1.800-1.825 1.875-1.900 "east" or 1.900-1.925 1.975-2.000 "west," 3.5-4.0, 7.0-7.3, 14.0-14.4, 26.96-27.23, 28.0-29.7, 50-54 and 144-148 Mc. A2, radioteletype and frequency-shift keying are grouped with A1, in the bands where they are allowed. A3: 1.800-1.825 1.875-1.900 "east" or 1.900-1.925 1.975-2.000 "west," 3.5-4.0, 14.2-14.3, 26.96-27.23, 28.5-29.7, 50-54, and 144-148 Mc. All forms of voice transmission will be grouped with A3, in the bands where they are allowed. (In Canada and Cuba, their respective 'phone bands apply.)

The use of more than one transmitter at one time in the same band is not allowed.

7. **Exchanges:** Signal reports and ARRL section (or specific location) must be exchanged in proof of contact.

8. **Valid Contacts:** In Class A, B and C, a valid contact is a completed exchange with any amateur station. In Classes D and E, a valid contact is a completed exchange with any station in Class A, B or C. Cross-band contacts are not allowed. Contacts by mobile stations may be made in motion or from any location(s). A station may be worked more than once only if the additional contacts are made on different bands.

9. **Field Day Message:** Special credit will be allowed to Class A, B and C entrants for originating by radio a message addressed to the SEC or SCM (see address in QST, p. 6) stating the number of operators, the field location, and the number of AREC members at the Field Day station. Only one message may be originated for such special credit.

10. Scoring:

Points: Each valid contact counts 1 point;

Credit for handling messages may be obtained as follows: 25 points for originating one Field Day message to SEC or SCM, 1 point for originating any message thereafter, 1 point for receiving a message and 1 point for sending a message onward by radio. There will be a deduction of 10 points for omission of handling data or for defects in form. Copies of all messages originated and relayed must accompany Field Day reports.

Multipliers:

Power: Output-stage plate input under 30 watts: 3. Output-stage plate input over 30 and under 100 watts: 2. Output-stage plate input over 100 and under 1000 watts: 1.

Independence-of-Mains: All radio equipment independent of commercial power source: 3. All radio equipment not independent of commercial power: 1.

Battery Power (applies to Classes B and C only): 1.5. The battery capacity or size shall in all cases be adequate to permit one hour's continuous operation of the station. Charging batteries from commercial mains while batteries are connected to transmitter or receiver voids the "independence-of-mains" and "battery power" multipliers.

Multipliers do not apply to Class D and E entries.

Final Score: The final score equals the total "points" multiplied by the "power multiplier" multiplied by the "independence-of-mains" multiplier (multiplied by the "battery power" multiplier, if applicable). Where different multipliers apply during the Field Day period, points are multiplied by the multiplier in effect at the time the points were earned.

11. **Club Aggregate-Mobile Scores:** Entries under Class C may be combined to form a "Club Aggregate-Mobile Score." The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the club territory, may contribute to the aggregate-mobile club listing.

12. **Reporting:** Mail reports or entries on or before July 15th. Reports must show bands used, dates and contact times, calls of stations worked, signal reports received and sent, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, location of station, number of persons participating, and score computations.

Sample Score

Assume a station operating in Class B with independent power and less than 30 watts input. If 40 valid contacts are made, 1 FD message originated, and 1 FD message relayed (received and sent on), the score would be computed as follows: $40 + 25 + 2 = 67$ points. 67×3 (power below 30 watts) $\times 3$ (independent power) = 603 claimed score. If the station were using battery power, the claimed score would be: $1.5 \times 603 = 904.5$.

Switch to Safety!

For the second month in a row we are faced with the heavy task of reporting the accidental electrocution of a radio amateur.

George P. Bent, Jr., W1AWX, met untimely death on April 7th while working on his transmitter. When discovered by his three-year-old daughter he was clutching a high-voltage lead in his left hand and a second wire was touching his foot. Doctors found electrical burns on both limbs.

W1AWX was a member of the postwar DXCC and the Rag Chasers' Club, and held an ARRL Public Service certificate for emergency work during the 1938 New England hurricane. He also was Eastern Massachusetts section winner in the c.w. portion of the 1950 Sweepstakes.

Boston area radio clubs have undertaken a fund-raising campaign to provide financial assistance for Mrs. Bent and her four small children. Contributions may be sent to either W1ALP or W1UC.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
JOHN E. CANN, WIRWS, Asst. Comm. Mgr., C.W.
GEORGE HART, WINJM, Natl. Emerg. Coordinator

J. A. MOSKEY, WJMY, Deputy Comm. Mgr.
L. G. McCOY, WHCP, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, Administrative Aide

Novice Opportunity! Just a few more weeks and it will be possible for those of us interested and ready to be examined by FCC for our new Novice Class amateur tickets! On a club contact trip through the Central, Midwest and Dakota Divisions hardly a meeting but what some Novice candidates would come forward afterward to ask about the prospective exam questions. In several cases our new young friends had carefully considered the first equipment that would be put on the air. It will for them just be a matter of counting the days after they take the examination until the FCC ticket arrives and they can start conversing with the old-timers and with other newcomers on 3700-3750 kc. (It is indeed important, as pointed out at some of the meetings, not to get signals on the air before the coveted ticket arrives even if you think you passed. One of the duties of the FCC is to run down stations not properly licensed and turn in evidence for necessary penalties to be invoked.)

How did it happen that some of our welcome new hams will have their gear ready to go when Uncle Sam's official FCC authorization arrives? This has been a result of the good old helping-hand policy. From the standpoint of you newcomers, WIAW can assist in learning-by-listening; also it is recommended that you try to get acquainted with some local code-using hams who have been in the game, to ask questions and advice on essentials and matters of interest; also wherever active radio clubs meet, inquire about the conditions for attending meetings and if any radio instruction, lectures, code groups, etc. are scheduled! Practically all clubs larger than social groups meeting in homes will welcome visitors, and many have an associate or nonvoting membership that can become a full membership as soon as one acquires an amateur license.

A transmitter that works in this 3700-3750 kc. range is highly recommended for a first transmitter . . . and if you will keep it busy, you will find yourself swapping QSL pasteboards and well on the way to Working All States for the coveted ARRL WAS certificate, as well as getting well up there in code proficiency and ready for the General Class amateur ticket right in the first several months of using your Novice ticket. Lots of fun is possible at the same time you are learning code and operating procedure through doing.

WIAW Slow-Speed Code Program. The schedule started May 1st is continuing for the special benefit of those interested in the Novice and Technician Class amateur licenses. The

League's station, WIAW, is transmitting an hour of code practice nightly. The frequencies are 1887, 3555, 7215, 14,100 kc. and 52 and 146 Mc.

Days	Speeds	Practice Starts at
Sat., Sun., Tues., Thurs.	5, 7½, 10, 15 w.p.m.	Sat. 8 P.M. EST; Sun., Tues., Thurs. 9:30 P.M. EST
Mon., Wed., Fri.	15, 20, 25, 30, 35 w.p.m.	9:30 P.M. EST (8:30 P.M. CST, 8:30 P.M. PST) N.B. If on daylight time, your clock will read one hour later.

Any receiver that has a beat oscillator and will tune to one of the above ranges will give you a good crack at getting some valuable on-the-air code practice. ARRL bulletins sent in code Mon. through Fri. are also on tape. By trying for those at 8 P.M. or midnight EST you can get in more practice. At those slowest speeds our characters will be sent at a rate to avoid the dragged-out effect and to give lots of empty-tape time for recognizing them. Don't limit practice to the slowest ranges (!) but stick with us right up to the fifteen-and-higher word speeds. You have to learn how to pass over a blurred or misunderstood character to focus your attention on the next one, and all the practice you can get will help get that license. For those who started earlier: On June 19th it is a "monthly qualifying run" from WIAW. . . . If you can put down a whole minute's worth without a miss at the ten-word speed, send your copy in to ARRL for correction and consideration for a League Code Proficiency Certificate. That is the lowest speed at which certificates are given, but you can stay with us for sticker certifications at progressively higher speeds as your proficiency builds up.

Radio Clubs Progress in Mobile Field. In the annual club reports of activity and status of programs, a noteworthy point was that the average club (there are 646 active affiliated clubs on the ARRL list) reported 8.5 dynamotors and 7.2 vibrator supplies as available. A short year ago the figure was but 4.3 dynamotors and 3.3 vibrator supplies per club. There has been increasing and natural amateur interest placed on mobile work, and lately quite a lot of amateurs are taking steps to be personally ready for civil defense participation through AREC and under their local defense authorities. Fifty-one new clubs were affiliated with ARRL in the last year. We're proud to present the Club Honor Roll this month, a listing of all those affiliated clubs having 100 per cent ARRL membership!

The availability of reliable surplus in the battery-powered h.v. supply field has been well maintained. Though the quotations have begun to climb on some of the more popular items like the PE-103-A, the prices are still nothing like the cost of recently manufactured stuff. Many of the 12- and 24-volt jobs are still dirt cheap and either a new extra battery to supplement the car battery, or more of those inexpensive turn-ins that have two good cells, and one to discard, can be obtained for almost nothing from any dealer to build up a 24-volt bank for home emergency rigs, if desired.

Will Your Club Have an Aggregate-Mobile Score in FD? The last annual Field Day listings (Dec. *QST*, p. 51) showed an increase of 150 per cent in the name listing of clubs for their mobile members reports. 'Tis no wonder, with five times as many mobiles in the fraternity as just a few years ago. This is a reminder that even the club members who don't go out on the FD can test mobile rigs and help the club to another listing under Club Aggregate-Mobile Scores. This is, of course, providing the club officers encourage, collect and report the individual mobile results obtained by bona fide club members during the period of the FD and forward them to HQ. "for the club."

June 23rd-24th . . . Don't Miss the ARRL Field Day. The biggest annual event in all amateur radio, that's of course the FD. It's an outing, but one in which the Communications Department urges stress on cooperative planning, testing of portable, mobile and emergency-powered rigs of all descriptions! There's fraternalism and fun and a chance to find how equipment stands up under the conditions of roughing it.

Some people set great store by the scores for a particular transmitter class. Many clubs siphon off just as many points as possible by putting just as many transmitters operating at the same time in the field as they can. Other clubs take it easier and give every operator, regardless of his experience and merit, an equal crack at operating and logging so he gets a full amount of experience in handling the station and the know-how of originating "the" Field Day message, or taking one that's coming through, if he's never done that before!

Summer vacation plans will probably call for a mobile in the car or an emergency station with handles, the kind our amateur world likes best of all for FD. Every ham who tries out equipment and operating afield on June 23rd and 24th can profit from the enjoyment, fraternalism and many practical lessons that only such field operation can give. Any and every amateur who gets his emergency-powered equipment set up and working and makes so much as one single two-way contact from afield has proved to himself that he could do this in a pinch, if all other means of communication should fail. He is a Field Day winner regardless of his other points or score! 73 and BCNU on FD.

— F.E.H.

ARRL AFFILIATED CLUB HONOR ROLL

In accordance with the Board policy for a special recognition of all affiliated clubs whose entire membership consists of members of the League, it is a pleasure to present herewith the latest Honor Roll of such affiliated clubs. The listings of clubs with 100 per cent ARRL membership are all determined from information supplied in the 1950 affiliated club questionnaire or Annual Information Survey conducted in accordance with Board instructions. There will be an additional QST Honor Roll published somewhat later this year to take care of those clubs reporting results of ARRL membership drives being conducted currently. This can also include consideration of full reports from any affiliated societies whose questionnaires gave incomplete information as well as others who may qualify for the listing on completing their membership program.

Amateur Radio Club of Augusta, Augusta, Ga.
Anniston Amateur Radio Club, Anniston, Ala.
Birmingham Amateur Radio Club, Birmingham, Ala.
Connecticut Wireless Association, West Hartford, Conn.
Detroit Amateur Radio Association, Detroit, Mich.
Inglewood Amateur Radio Club, Inc., Hawthorne, Calif.
Kingsport Amateur Radio Club, Inc., Kingsport, Tenn.
M.A.K. Radio Association, Lincoln, Mass.
Muscle Shoals Amateur Radio Club, Florence, Ala.
Nashville Amateur Radio Club, Nashville, Tenn.
North Shore Radio Club, Jackson Heights, N. Y.
O B P, Chapter No. 1, St. Louis, Mo.
O B P, Chapter No. 3, Kansas City, Mo.
Pioneer Radio Club, Fremont, Nebr.
Ridgewood Amateur Radio Club, Westwood, N. J.
South Lyme Beer, Chowder and Propagation Society, West Hartford, Conn.
T-9 Radio Club, Danvers, Mass.
Valley Radio Society, North Hollywood, California
York Road Radio Club, Elkins Park, Pa.

BRIEF

Amateurs have been asked to handle communications for boat races, parades, etc., but the Dial Radio Club of Middletown, Ohio, was probably the first group called on to furnish communications for a kite-flying contest. The Middletown Junior Chamber of Commerce found it necessary to conduct the contest, held April 8th, at three different parks because of the large number of participants. By making use of amateur radio they were able to coordinate the three separate operations. Five mobile units and two fixed stations gave the affair complete coverage by allowing the judges and officials to confer with each other and agree on results. W8s YFS, FVW, AZH, MGA and FAD operated mobile from the parks while W8ZRV and W8EQJ monitored and assisted from their home stations.

ARRL ACTIVITIES CALENDAR

June 4th: CP Qualifying Run — W6OWP
June 9th-10th: V.H.F. Contest
June 19th: CP Qualifying Run — W1AW, WFTQD
June 23rd-24th: ARRL Field Day
July 13th: CP Qualifying Run — W6OWP
July 19th: CP Qualifying Run — W1AW, WFTQD
July 21st: CD QSO Party (c.w.)
July 28th: CD QSO Party (phone)
Aug. 9th: CP Qualifying Run — W6OWP
Aug. 20th: CP Qualifying Run — W1AW, WFTQD
Sept. 8th: CP Qualifying Run — W6OWP
Sept. 14th: CP Qualifying Run — W1AW, WFTQD
Sept. 22nd-23rd: V.H.F. Contest
Oct. 7th: CP Qualifying Run — W6OWP
Oct. 13th: Simulated Emergency Test
Oct. 17th: CP Qualifying Run — W1AW, WFTQD
Oct. 20th: CD QSO Party (c.w.)
Oct. 27th: CD QSO Party (phone)



The annual June Field Day is usually a function of the organized amateur radio club. In recent years, however, more and more Emergency Corps groups have been going out, and this is an encouraging development. This year, with all groups interested in civil defense, we expect there will be a greater participation by AREC groups than ever before. At least, we hope there will be; for where no club exists, or where some amateurs are not included in the local club group, or where the local club group takes no interest in emergency work and the AREC organization is therefore formed outside the club, it is more desirable than otherwise that the emergency-minded group go out separately and get in on the fun.

The Field Day is our biggest activity of the year — and in these days, perhaps our most important. We need now more than ever to demonstrate our ability to take to the field and set up communications "control centers" using emergency power facilities and getting along without the accustomed modern luxuries. For 24 hours our field stations — hundreds of them — operate at high speed, usually under the most grueling conditions, pestered by insects, inclement weather (FD is traditionally scheduled for the "first rainy week end in June"), heat, cold, dampness, wild animals, equipment and power failures, lack of sleep, and what-have-you. And still, at 0400 Sunday morning you will hear almost as many field stations as you will hear at 2000 Saturday night. FD is the sort of thing you look forward to all year; then while you are nodding over your receiver in a tent out in the wilderness, you get to wondering if you should see your psychiatrist; and after it's all over, you start thinking of the improvements you are going to make for next year's FD.

As a public demonstration of amateur versatility, the annual FD can't be best. We all have other interests, and we all have to eat, but we all owe it to ourselves and our hobby to get out on the week end of June 23rd-24th and put some kind of a rig on the air. So start making your plans now — to go out in the field in this year's FD!

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The AREC of southwestern Kansas sprang into action on March 28th when a combination of freezing rain, snow and wind caused extensive crippling to communications and power lines in that area. EC W#TYR of Dodge City handled traffic for Western Union from his own station, then shifted to W#NOE when his power failed and continued, adding the AT/SF Railroad and REA to the agencies served. W#CKV and PFX took over when W#TYR had to work. W#BET, EUZ, KRV and UFP were also active in handling traffic for WU, REA and the railroads, often by circuitous relays. On 160 meters, W#VGX and GWI handled some very important traffic locating some lost trains. W#AQD operated on emergency power for three days, handling traffic for the railroad and power companies. W#WOB helped serve Western Union. W#NXJ handled some weather traffic for the CAA. W#HS of Topeka, who can write down traffic in Braille as fast as most of us can in longhand, stood by relaying traffic and keeping the press informed. W#AGC recorded a QSO between a reporter and stations in the stricken area which was rebroadcast over WIBW. Other

amateurs known to have been active and assisting were W#BVU GBY LOU MVG RVM UID YCO.

A letter to ARRL from a CAA official in Kansas City expressed appreciation for the part played by amateurs in assisting CAA in this emergency. SCM W#ICV says, "It was another of those jobs well done by Kansas amateurs."

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On March 11th Western Minnesota experienced a severe snowstorm which stopped all transportation of any kind in the area around Wheaton. All available CAP aircraft were sent into the area, and amateur radio communications facilities were set up. W#FYT in Wheaton took over as NCS in that area with W#ORJ helping out at Fergus Falls. W#s ORE, BRA and EG were relief operators at W#FYT. NCS in Minneapolis was W#LVG, operated by W#LVG himself and W#s CO SJK ITQ EPJ and YLZ. This set-up was in operation for about ten days before the highways were again open. Other amateurs helping out in handling traffic and clearing the net frequency were W#s AAS ATD BGY BOL CWB FIT GKP GYH HEO IEL IPA JDO JIE KFF LCM LPT MLM MRX MXC NJQ QIQ RA RPT TGF UCV UTU WAS YBM ZNE ZNM and ZOB.

— W#MXC, SCM Minn.

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On Sunday evening, April 1st, a 16-year-old girl and her escort were kidnapped at McAlester, Okla., and taken into the sparsely-settled mountain regions to the northwest. W#BIE moved out with the search party in his mobile on the morning of April 2nd. The Okla. "Phone Emergency Net" set up a guard net to keep his operating frequency of 3882 clear of QRM so that contact could be maintained between the searching party and McAlester. W#s OQM, SEK and HEL kept the vigil in McAlester. During a period when contact between W#BIE and McAlester was impossible on 75 meters, W#s FRB, CUH and WQ in Western Oklahoma relayed information. Other stations operating in the guard net were W#s BGC JFT PHD PA SEK and W#UBV/E.

W#BGC and W#PRA set up a low-power station at Kintam, Okla., which was the headquarters of the searching party. However, they were unable to make contact with W#BIE due to heavy foreign commercial QRM (ARRL has filed a protest as a result of this incident). The next day, when the foreign commercial was not heard, operation was conducted successfully.

Oh yes — the girl was rescued unharmed early Wednesday morning, April 4th.

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The City of Vancouver, B. C., is supplied with electric power through a series of small hydro plants, some of which are many miles from the city with virgin wilderness between. F.m. radio and carrier-current "phone normally supply communication with the outlying plants, but the company has sought the assistance of amateurs to supplement this system. In mid-February an entirely unannounced test was held of the amateur set-up. Mobile units were dispatched to local substations and a unit to the load dispatcher. Within 45 minutes of the alerting time, all mobiles were in place. Within two hours the entire net (on 3755 kc.) was active. Most of the mobiles experienced terrific QRM from the proximity of high-voltage transmission lines, but in most cases the control station broke through the noise. Power company engineers were greatly pleased with the results of the test.

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On February 28th a mother and her daughter were stranded in the wilderness near Denver, Colo., and the two Denver emergency networks, the Sky High Net and the Denver Area Civilian Emergency Net, sprang into action

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On March 22nd, Aurora (Ill.) amateurs conducted "Operation SAME" (Simulated Aurora Medical Emergency) to demonstrate the ability of amateurs to summon medical supplies and personnel in the event of a communications emergency, and to give "green" operators their first test under simulated emergency conditions. The operation, originated by W#NFK and W#EQC, was conducted on 2 meters. Twelve mobiles and seven fixed stations participated. The photo shows Dr. Felix Tornabene, civil defense medical director, W#EQC and W#BFI at a control station in contact with a mobile unit. (Photo courtesy Aurora Beacon News)



QST for

to render assistance. W8IVC set up a portable transmitter at Cherry Creek Dam and W8s WIR, OTR, WLN, BYE, BUI, CAA (with BRM assisting), GQN and DDF were alerted, most of them taking off in their mobiles. W8s UCS and RZK also assisted. The entire area was searched by mobile and on foot until the missing car and its unharmed occupants were found by W8BYE/M shortly after midnight. All mobile units were contacted and reported to search headquarters at the dam, and the operation was buttoned up at 0400. It was the first test under actual emergency conditions and was considered highly successful.

Amateurs in Medicine Hat, Alberta, were called into action on March 31st when ice jamming the river threatened the city with a major flood emergency. The amateurs helped supply Canadian military authorities, who were attempting to break up the ice jam, with additional needed communications facilities. EC VE6OE set up in the city as net control, while VE6IK and VE8NA took emergency gear to the scene of the operation. VE8AU, some 35 miles upstream, relayed river stage reports from that point. Communication was by amateur radio between the base of operations, where high-explosive charges were being used to blow the ice loose, and the supply base in the city, and between the various operating teams along the river. Meanwhile, the water in the city had driven hundreds of people out of their homes. The operation was terminated on April 5th after being in full swing for six days. Those who took part not already mentioned were VE6s ES JF NH OP NT PB VA VX UH ZH and ZW. A total of 802 messages was handled.

A request from a Norwegian tanker for assistance in locating a seaplane to transport a critically ill crew member to a hospital mobilized the Canal Zone AREC into action in mid-February. SEC KZ5FL alerted the Zone ECs and in a short time amateurs in the Canal Zone, Costa Rica, Colombia, Ecuador and Peru were joined in a complex radio network searching out rivers, bays and inlets for any available seaplane, continuing from 2035 Feb. 13th to 0900 of the next day. The search turned out to be fruitless (however, the sick man eventually reached a hospital and underwent a successful operation), but, says SCM KZ5AW, the boys turned in a highly commendable emergency operation. The operation was complicated by the fact that some of the operators engaged spoke only English, some only Spanish, and those who spoke both languages got a real workout. With apologies to any left out, KZ5AW lists the following as having participated: KZ5s AC FL GD NJ NM PM and RM; HP1LA; HC2s AF LF OS and OL; TI2JV; OA4s AT AO D ED and M; HK3s EQ EQ ER HY IQ JM JY and BO.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Wyoming.....	Arlen D. Gaddin, W7HNI	Mar. 1, 1951
Missouri.....	Clarence L. Arundale, W9GBJ	Mar. 1, 1951
Maine.....	Orestes R. Brackett, W1PTL	April 16, 1951
Wisconsin.....	Rene W. Goetsch, W9RQM	May 12, 1951
Iowa.....	William G. Davis, W8PP	June 16, 1951

In the Los Angeles Section of the Southwestern Division, Mr. Samuel A. Greenlee, W6ESR, and Mr. William J. Schuch, W6CMN, were nominated. Mr. Greenlee received 322 votes and Mr. Schuch received 291 votes. Mr. Greenlee's term of office began April 12, 1951.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid

nominating petitions were received in response to previous notices, the closing dates are set ahead of the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the
..... ARRL Section of the
Division, hereby nominate
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take this initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
British Columbia *	June 15, 1951	Ernest Savage	Aug. 22, 1951
Southern New Jersey	June 15, 1951	Dr. Luther M. Mikarian	Aug. 26, 1951
Yukon *	July 2, 1951	W. R. Williamson	Mar. 17, 1949
South Dakota	July 2, 1951	J. S. Fosberg	Resigned
South Carolina	July 2, 1951	Wade H. Holland	Sept. 1, 1951
Nebraska	July 2, 1951	Scott E. Davison	Sept. 1, 1951
Indiana	Aug. 15, 1951	Wilber E. Monigan	Oct. 14, 1951
New Mexico	Aug. 15, 1951	Lawrence R. Walsh	Oct. 20, 1951

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WIAW/W7QTD will be made on June 19th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from WIAW will be 1887, 3555, 7215, 14,100, 28,000, 52,000 and 146,000 kc. W7QTD will transmit on 3534 kc. The next qualifying run from W6OWP only will be transmitted on June 4th at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from WIAW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from April QST
June 1st:	Radiological Monitoring, p. 10
June 4th:	By-passing for Harmonic Reduction, p. 14
June 6th:	A Bandswitching Converter . . . p. 23
June 12th:	Auditory Test Equipment, p. 27
June 14th:	"TVI-Proofing" . . . p. 31
June 20th:	All About the PE105A Dynamotor, p. 44
June 22nd:	The World Above 60 Mc., p. 51
June 25th:	Overtone Crystal Oscillator Circuits, p. 56
June 28th:	Technical Topics, p. 64



Hal Reid, WØZJO, recently-appointed manager of the Pacific Area Net, first broke into the BPL in the summer of 1949, and has since forced his SCM to fork over 19 BPL certificates. One of the original NTS proponents, Hal took over the Mountain Area Net when WØIC was forced to resign, became NCS of PAN when MAN was discontinued, and just naturally fell into the PAN managerial job when it became vacant early this year. WØZJO's strong signal, born of a pair of 813s, is a "natural" in a net which includes regular participants from both coasts.

TRAFFIC TOPICS

Two types of messages which are often incorrectly used are the service message and the "ARL text" message. We discussed the latter in QST last March (1950), but some of the boys think it can stand repeating.

A "service" (SVC) message is one sent from station to station concerning the status of another message. It may refer to delayed transmission, inability to deliver, permission to make changes, or any of a number of "service" conditions which might exist. Usually, it refers to non-deliveries. The booklet *Operating an Amateur Radio Station* (free to ARRL members) covers the subject in general. What should be added is that when a SVC refers to inability to make delivery, it should include the full name and address as received, so the originator can determine immediately whether nondelivery is due to an error in transmission, and make due correction by return message. Thanks to W1AYC for pointing this out to us. Of course we don't make mistakes in copying or transmitting—but maybe the other fellow might.

As for ARL-text messages, we refer you to March, 1950, QST, page 68. Messages using ARL texts are more often transmitted improperly than properly, in our experience. For the benefit of those who do not have access to this issue, we repeat that the symbol ARL in the preamble simply indicates that an ARL text-number is included in the text. It does not indicate which text or how many texts are included. If more than one ARL text is included, the word "STOP" should be inserted between them in order to avoid confusion, and when the number is a compound it helps to send it as one word (e.g., FIFTYSEVEN). If an additional message is added to the ARL text number, it is also added to the check count. Here's an example of a double ARL-text message with an added message: "FIFTYFIVE STOP TEN STOP SAY HELLO TO EVERYBODY." The check on this message would be ARL 8, and delivered to the addressee it would read: "MERRY CHRISTMAS AND HAPPY NEW YEAR. WILL BE HOME AS SOON AS CONDITIONS PERMIT. SAY HELLO TO EVERYBODY."

April, May and December were the big traffic months in 1950, if BPL listings are any indication. December is a big month every year, but the other big months are not always the same. In 1949 they were February and March, in 1948 February and October. The following tabulation, showing the total number of BPL listings for each year, 1947 through 1950, will be of interest to traffickers who follow the over-all progress of amateur traffic from year to year:

Jan.....	6-12-22-36	July.....	3- 5-18-21
Feb.....	19-27-52-41	Aug.....	4-11-39-29
Mar.....	10-21-65-43	Sept.....	13-16-34-40
Apr.....	9-17-57-65	Oct.....	14-24-35-44
May.....	12- 8-18-59	Nov.....	11-19-43-21
June.....	7- 9-18-18	Dec.....	29-30-68-82

Totals: 1947—137; 1948—199; 1949—469; 1950—499.

Some of the c.w. traffic men who frequent the 80-meter band (and that includes most of them) are getting worried

about the way a hunk of their frequencies was lopped off by U. S. 'phone, and then another hunk by Canadian 'phone. We're speaking in practical, not legal terms, of course. Many are also wondering how the traffic nets are going to get along with the Novices. Nets in the 3725-3750 region are already encountering difficulty and are moving down the band, or preparing to. Some of the apprehension drifted into Hq. in the mails and set us to analyzing the situation, as we did last year when most of this was on the horizon but not yet with us (see Feb., 1950, QST, p. 56).

It being evident that it takes seven nets meeting once per week to occupy as many "channel hours" as one net meeting seven times per week, the degree of occupancy by nets is not so much a function of the number of nets as it is the number of net sessions during a certain period of time (for the purpose of this study, one week). On that basis, then, we make the following observations:

1) A total of 1136 net sessions are held on the amateur bands every week. Of these, 658 are c.w. nets, 478 'phone nets.

2) Of all net sessions, 906 are conducted in the frequency band 3500-4000 kc. Of these, 604 are c.w. sessions and 302 'phone sessions. The total breakdown by bands is as follows: 1.8-2.0 Mc., 31; 3.5-3.8 Mc. (c.w.), 604; 3.725-4.0 Mc. ('phone), 302; 7-7.3 Mc., 54; 14-14.4 Mc., 6; 28-29.7 Mc., 88; 144-148 Mc., 51.

3) On 80-meter c.w., the band which carries over half of the total net sessions per week, the 100 nets registered average six net sessions per week. This is because a good many of these nets meet twice, and some of them three times daily. 'Phone nets on 75 meters average 4 sessions per week.

4) A total of 190 net sessions per week convene at 1900 EST in the 80-meter c.w. band. This is an average of about 27 per day, including Sunday (when most nets do not actually operate). Some days of the week, there are probably more than 30 nets in simultaneous operation in this band—in a segment of frequencies which will provide only 44 five-ke. channels between 3500-3725 kc. Sixty-nine sessions per week convene at 1900 EST on 75 'phone, an average of 9 per day on 20 ten-ke. channels.

5) Of the 44 five-ke. channels between 3500 and 3725, only four (3505, 3510, 3555 and 3620) do not have nets registered on them. The spots 3505 and 3510 are considered too close to the edge (and DX frequencies, too!); 3555 is WIAW's frequency. There must also be something wrong with 3620—a foreign commercial, maybe?

As we face the prospect of a further squeeze, the outlook might look pretty bleak—but it isn't. We're not using our present frequencies to best advantage; far from it. More sharing is necessary. There are still many channels which are considered the exclusive "property" of a single net and are used by that net alone; but if a time-occupancy chart were to be made up showing the percentage of time that each channel is used by a net, it would show that even during the critical period between 1900-2200 EST each five-ke. channel is used only a small percentage of the time. Nevertheless, the time is approaching when we will have to consider seriously the prospect of limiting the time of our net drills, as mentioned in this column in August, 1950, QST, p. 52, so that the time available can be shared with other nets.

National Traffic System News. W7FIX, in his latest Pacific Area Net News, proposes a frequency plan for NTS in which all area and regional and some of the section nets would operate on frequencies between 3600 and 3700. It is not illogical that NTS, which is already systematic in routings and time schedules, should also be systematic in use of frequencies. Some further study is due W7FIX's plan, and perhaps, with a meeting of minds of NTS net managers and personnel, it might be feasible to put some such a frequency plan in operation next fall. Meanwhile, how are your summer plans coming along?

March reports received from CAN, PAN, 1RN, 2RN, 3RN, 4RN, RN7, 8RN, TEN, TRN and QIN. Some day we're going to get reports from all areas and regions and won't be able to stand the shock.

Net	Ses- sions	T/c	High	Low	Aver- age	Most Consistent
CAN.....	37	750	56	10	28	
PAN.....	27	1173	68	21	43	
1RN.....	39	385	58	0	10	Conn., N. H.
2RN.....	22	202	32	2	9	NLI
2RN *.....	20	253	37	0	13	NYS
3RN.....	44	225				
4RN.....	44	309	26	0	7	Va., S. C.
RN7.....	44	388	30	3	8	Idaho, Ore.
8RN.....	33	117	17	0	4	Ohio
TEN.....	24	1273	119	23	51	La., Minn., Nebr.
TRN.....	42	77	7	0	2	Ont.
Ind. (QIN)...	54	691	59	0	13	

* February data.

Eastern Area Net (3705 kc.): W2CLL has resigned as manager effective as soon as we can get a replacement for him. The SCM job, civil defense work and this business of eating got in the way, and Geo decided to turn over the job to someone who could give it more time. But who?

Central Area Net (3670 kc.): Frequency situation becoming serious and some consideration being given to changing. Certificates have been issued to W5KRX, W0KZZ, W0BVG and W0ITQ.

Pacific Area Net (3670 kc.): W0ZJO and W7NH are doing all the NCS work and want some assistance. Can't some of the rest of you fellows take a shot at PAN NCS once a week? The following have really earned the PAN certificates they have received: W1s EMG NJM; W2s RUF ZVW; W3s GEG GZH; W6s HC GYH; W7s FRU NH PST UTM; W9s BVG KZZ MQV.

Second Regional Net (3690 kc.): W2PRE says representatives from the three section nets are often very late in reporting, greatly delaying the net. Section nets could help out this situation by being a bit more prompt in sending a representative to 2RN each night.

Third Regional Net (3590 kc.): W3GZH, a 3RN stand-by, is moving to Illinois. He will be missed, but expect we'll hear him in 9RN and CAN before long. Certificates were issued in February to W3s AXA BIP CUL FWP JZY GZH LOJ LZM NCD NRE OML ONB; K3FMC.

Fifth Regional Net (3645 kc.): W4NNJ is now on the night shift and had to resign as net manager. W4APC is acting manager, but won't be on this summer, so we're looking for a new RN5 manager. Wade, W4NNJ, is still active Saturday nights on CAN. W5PTV is the latest recipient of an RN5 certificate.

Sixth Regional Net (3725 kc.): RN6 will continue to operate five nights a week throughout the summer. Starting May 1st, operation will commence one hour earlier. Contact is needed with Hawaii — any KHGs interested in traffic these days? RN6 certificates have been issued to W6s BAM CMN ELQ GYH HC JQB LDR PIV QXN UTY ZJ; W7s MJP PST; W0ZJO.

Seventh Regional Net (3575 kc.): Wanted — stations to represent Wyoming, Alaska and Saskatchewan in RN7. Aren't there any traffickers in those places? W7NH says that they are looking for more stations anywhere in the Seventh Region who are interested in NCS or liaison assignments.

Tenth Regional Net (3735 kc.): VE phones are causing considerable QRM, and W8SCA is studying the possibility of finding a new frequency below 3725. Summer schedule will go into effect May 1st with one session lasting until traffic is cleared.

Twelfth Regional Net (3700 kc.): W0ZJO and W7UTM have started up TWN again, after a long period of dormancy. The net at present is combined with the Colo.-Utah

Section (Interstate Utility) Net, but representation is also available from New Mexico. They need Arizona. TWN meets at 1945 MST Monday through Friday on 3700 kc.

Thirteenth Regional Net (3675 kc.): All sections have been regular, with Ontario's Beaver Net 100 per cent in attendance in March. Traffic increasing. VE2BB has been issued a certificate. VE2CD off air due to business pressure.

BRIEF

W4CYW and W4FJ in Richmond are the south end of the new 2-meter Washington-Richmond RTTY circuit. W3PYW and W4JCV hold down the north end of this nightly-except-Sat.-and-Sun. set-up.

W3PKF (Frederick) and W2PAU are working on plans to link New York City and Richmond, Virginia "no later than Spring or bust"! W3PZA at the National American Red Cross is being equipped. If interested in joining this net write W3PYW, 2706 Harmon Road, Silver Spring, Maryland.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for March traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL.....	179	1298	1927	139	2643
K06FAA.....	968	541	428	111	2048
W6KYV.....	19	1091	114	887	2020
J42AC.....	529	705	578	123	1935
W0ZJO.....	9	849	803	39	1700
W6JZ.....	10	844	763	54	1671
W0ILH.....	37	815	785	31	1668
W7IOQ.....	71	726	734	63	1594
W6GYH.....	18	677	487	180	1362
W7CZY.....	4	633	635	8	1270
W4PL.....	4	627	638	89	1258
W3LSN.....	6	608	598	10	1222
W3NHI.....	23	587	489	86	1190
W0TQD.....	3	529	533	2	1067
K4WAR.....	709	172	85	87	1053
W0UHY.....	4	496	495	6	1000
W6ZEU.....	13	446	425	21	905
W6BAM.....	20	436	372	64	898
W6JTX.....	13	460	320	47	830
W2BO.....	25	376	324	61	786
W0AT.....	42	342	349	34	767
W8SCA.....	4	382	375	6	767
W0JUU.....	51	367	353	5	775
W2RUF.....	19	374	253	50	696
W3UPT.....	36	290	296	30	652
W3NRE.....	13	314	274	36	637
W8AUJ.....	6	321	296	10	633
W7FRU.....	4	316	260	22	632
W0RYO.....	3	288	301	13	605
W5FOM.....	529	39	17	6	588
W7BH.....	0	0	334	21	355
W5PTV.....	8	283	239	33	554
W6ELQ.....	14	275	201	62	553
W0ESJ.....	51	250	186	64	551
W0LVQ.....	62	238	150	88	538
W8RJC.....	35	231	232	11	529
W3HJV.....	4	284	256	3	537
W8BRS.....	31	247	181	78	517
K4AIR.....	193	158	120	38	509
W0ITQ.....	5	252	161	86	504
W4CYC.....	5	249	240	9	503
W4OGG.....	20	241	210	31	502

The following made the BPL for 100 or more originations-plus-deliveries:

K5WAH.....	214	W4MWH.....	150	W8YCP.....	108
W5FOG.....	210	W0DGA.....	149	K06FG.....	107
W4NJE.....	193	W0NZS.....	143	W4OCG.....	106
W7ESJ.....	180	W7ITH.....	138	W8FEC.....	105
W8RIT.....	179	W4ANK.....	124	W7KCU.....	103
W9QQQ.....	155	W3PCP.....	123	W6SD/.....	101
		W8DAE.....	121		

A minimum total of 800 or more or 100 or more originations-plus-deliveries will put you in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C. W.	'PHONE
7100 kc. (day)	3875 kc.
3550 kc. (night)	14,225 kc.
14,050 kc.	29,640 kc.
28,100 kc.	

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060, 28,250 kc.; 'phone — 3815, 14,160 kc.

160-METER DX TESTS

A report received from W1BB indicates that the 160-Meter DX tests held during January, February and March were unusually successful. There was considerable interest in the tests, particularly on the part of W, VE and G operators. It was anticipated that participation would be mainly by stations in Africa, Europe and the Americas. Logs received after the tests, however, show worked and heard reports from all continents.

Most outstanding and consistent station in the tests was EK1AO; 300 watts and a doublet antenna were used in chalking up 32 trans-Atlantic contacts. Operations on January 28th resulted in 17 contacts between Tangier and W/VE. On this side of the Atlantic, W1BB had the highest contact total. Stew made 26 contacts during the tests. His best day was February 10th, when he worked 10 stations in the British Isles. W1BB also worked EK1AO, HC1JW, and was heard by ZL1AH during other periods of the test. Also turning in an outstanding performance was VE1EA, who achieved 15 transoceanic contacts. W1LYV was next in line with 12 DX QSOs. Overseas, GW3ZV with 15 contacts and G6GM with 11 contacts turned in the best logs. Each of the following made one or more intercontinent contacts: W1s BEU EFN DVS KDX PLO RQR SAN SS ZE, W2s BLR BFA EQS ESO PEO PTV UKS, W3s EIS LIJ LOE PMG, W4KFC, W5s BKH FLH, W6s CVQ FIM FNE, VE3AAZ, G2s DA NM PL, G3s DIY ERN PU SU, G4s GU HB JU RI UB, G6s BQ LB QB, G8NF, GW3FSP, HC1JW, HZ1KE, KV4AA. In addition to those already mentioned, about forty other overseas stations were known to have been on the air during the tests, but in the absence of reports their results are not known.

Other highlights of the tests: The first claimed 160-meter contact between Asia and North America, VE1EA and HZ1KE, on January 14th. Both W1BB and W9CVQ were heard by ZL1MP on March 11th. An unconfirmed report has it that W2QHH, using 20 watts and a random-length antenna only 12 feet off the ground, was heard by ZL1HM. GW3ZV used only 10 watts and an antenna several miles long! W9PNE used a 77 detector-GJ5 audio for receiving!

BRIEF

Here's a success story that may offer some encouragement to DX hounds who in spite of high-power gear and fancy antennas often think the cards are stacked against them. In the past four years George Clark, W2JBL, has worked 100 countries and has 81 confirmed. He hasn't used beam antennas or even moderate power. All his DXing has been done on 20-meter c.w. with a center-loaded whip antenna, a Collins 310B-3 rig and 45 watts input. Total length of the whip is 8 feet 10 inches. Fed with RGS-U coax, the antenna is mounted horizontally about sixty feet above ground. George isn't claiming any records for the power used, but he is wondering if anybody has worked as many countries using a short whip antenna. Any challengers?

It's a small world! Dr. Luther M. Mkitarian, W2ASG, Southern New Jersey SCM, pounded out a CQ on 3.5 Mc. recently and received a reply from W4PAJ. After the usual exchange of pleasantries the fellows started to chat in the typical manner of all good rag-chewers. Both were pleasantly surprised to find that they were buddies in World War I, having worked together as operators at WUB. Old friendship renewed by the magic of ham radio!

DXCC NOTES

Early in April we received the long-awaited proof that CZ2AC and ZA2AA were "pirates" operating from Switzerland. Similar cases have also recently been closed on PX1A and 3A1A. Deduction of credit from the totals of all DXCC men who submitted QSLs from any of these four stations was completed several weeks ago, at which time cards were sent out announcing deletions and new totals. This explains the drop in totals of some stations in this month's DXCC Honor Roll listings.

BRIEF

The New Members section of the DXCC box in April QST lists W9GBJ incorrectly as W9BGJ. Our apologies to W9GBJ for this error.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....236	W3BES.....229	G2PL.....225
W8HGW.....235	W6ENV.....229	W6BEG.....224
W6VFR.....231	W9YXO.....227	W3CPV.....223
	W2BXA.....226	

RADIOTELEPHONE

W1FH.....196	VQ4ERR.....190	W9RBI.....179
LU6AJ.....193	W8HGW.....189	W2BXA.....177
XE1AC.....192	PY3CK.....189	W1JCX.....174
	W6DI.....181	

From March 15 to April 15, 1951, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

G6QB.....136	G6CB.....105	SM6ID.....102
W4GOG.....117	GM3CIX.....105	ZL1QW.....102
ZS6OV.....115	G3CQF.....104	W4KWC.....100
HB9BN.....109	G2CLL.....104	W6UFU.....100
G2DC.....109	DL4FS.....103	W6YX.....100
VK6DX.....105	G2HGX.....103	VE1NE.....100
ZS6SB.....105	11PQ.....103	W8EKK.....100
	W0ZDM.....102	

RADIOTELEPHONE

W4BOC.....121	F3OX.....104	W8DXO.....100
PY1FR.....115	G2AKR.....103	W5GZ.....100
G3COJ.....108	W8MKY.....103	PA9QJ.....100
VE3KF.....106	VS1AY.....101	W8LJ.....100

ENDORSEMENTS

W6AM.....220	W2GVZ.....150	W5GZ.....126
W8JIN.....210	G3YF.....150	W6LMZ.....126
W6TS.....200	VK4EL.....150	ZS2AT.....125
PY1CJ.....200	W2CTO.....146	G2BXP.....124
ZS2X.....199	SM7MS.....142	VE5JV.....122
W3WZ.....192	E1AQ.....142	W0UXO.....120
ON4QF.....191	G3COJ.....142	OH2RY.....120
W8SYC.....180	W2GFW.....140	W2WFL.....120
W0LNM.....180	G3AKU.....140	W7JYZ.....111
KP4KD.....180	W8MFW.....140	VP8FR.....111
W8AND.....170	W2PJM.....132	I1ADW.....110
HB9EU.....163	W2WC.....132	I1UB.....110
G2AJ.....162	W1BGW.....132	G3CDG.....110
KH6LG.....154	G3AWP.....130	W6AX.....110

RADIOTELEPHONE

PK4DA.....162	G2BXP.....121	W2YYL.....110
G2ZB.....161	W4DCQ.....120	W3EYV.....110
W3BES.....151	W1GKK.....120	W8DMJ.....110
W3JNN.....147	I1AXD.....120	W2GX.....110
YV5AB.....130	E1AQ.....110	

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Jerry Mathis, W3BES—BYK now is Class A. EU wants news on hamfests. Pennsylvania MARS is on 4095 kc. at 8 p.m. Traffic accepted in ham bands is relayed over the MARS nets. The Schuylkill ARC annual dinner was successful, with a large attendance. EAN is on 3.8-Mc. phone. The Abington Township ARA is working on Field Day plans. RFI works 3.5, 7, 28, and 144 Mc. RCE may be found on 3.5 and 28 Mc. New officers of the Susquehanna Valley ARC are NES, pres.; BFH, vice-pres.; IVM, secy.-treas.; 2AWK, asst. secy.-treas. The trustees are UVG, QJP, and MOZ. The Club has an emergency net on 146.304 kc., which will be used for civil defense later. The Club meets every Tuesday at 9 p.m. KRQ and SCB have joined the MARS. QIR is building a new 813 rig and will have it on 3.5-Mc. c.w. soon. He has a ZL QSO with 135 watts on 3.5 Mc. Our Communications Manager, F. E. Handy, IBDI, addressed a gathering of Philadelphia Area hams. The meeting was arranged and sponsored by the Philadelphia Area Council of Radio Clubs. Much interest was shown in the civil defense set-up which was the keynote of Mr. Handy's talk. Also present were our local FCC engineers, Director Brad Martin (who introduced the speaker), and Southern New Jersey SCM, Dr. Mkitarian, 2ASG. Traffic: (Mar.) W3CUL 2643, NHI 1190, BIP 327, OML 112, AXA 84, ANK 63, OAG 44, PDJ 30, QEW 18, ADE 16, CAU 5, DQE 5, ELI 3.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, James W. John, W3OMN—Dr. Chapannis, of Johns Hopkins University, spoke on "Intelligibility of Speech" at Chesapeake ARC meeting of March 6th. The March 20th meeting was devoted to a general discussion on "Acquisition of Real Estate." The Capitol Suburban RC meetings in March were devoted to civil defense communications. The Potomac-Rappahannock Valley Net functioned with PYW and FPQ as Net Controls during March. LC/3 and QWN are newcomers to the Net. Members of the Washington RC at its March 10th meeting discussed "14-Wave Study—How and Why." On April 4th the Washington Mobile and Washington RC enjoyed a talk and general discussion by IBDI concerning civil defense. Ann Arundel County amateurs have organized a radio club and a civil defense net on 3850 kc. Amateurs in the County should contact UF for information. The Rock Creek ARA elected the following officers in March: KOA, pres.; AIR, sr. vice-pres.; RGX, jr. vice-pres.; PCI, secy.; PZK, treas. PRZ has moved to Memphis and JVV to Buffalo. PTZ had the questionable honor of someone using his call and handle. EYX visited General Electric and saw too many TV sets being built. QZC has a new 100-watt 814 final and no TVL QYL operator at WWIN, is owner of new NC-125. NLS is QRF because of rig trouble. AKB is building a new 14-kw. rig and BWT is rebuilding a kw. rig for break-in operation. CVE is QRT while recovering from injuries received while roller skating. ECP completed postwar WAS on 3.5-Mc. c.w.; LO-Nite furnished the two states needed. The following civil defense organizations have been named: Capitol Suburban RC for Prince George County—net meets on 28 Mc. at 9:00 p.m. Sundays with IZL as Net Control; JGN for Montgomery County—net on 144 Mc. and 28 Mc. at 7:00 p.m. Tuesdays with AIR as Net Control; NPW for District of Columbia. Traffic: W3UF 652, HJV 527, LZM 393, ECP 109, CVE 137, JZY 114, FWP 105, AKB 70, MCG 35, ONB 25, PWL 25, GUB 23, NNX 14, COK 8, JHW 7, EWT 6, LAX 6, IZL 5, AKB 4.

SOUTHERN NEW JERSEY—SCM, Dr. Luther M. Mkitarian, W2ASG—By the time this is published it will be known by all amateurs in this State that Assembly Bill 106 has been approved by both Houses without any opposition and is awaiting the Governor's signature in order to become a State Law. We, the amateurs in this State, owe a great debt of gratitude to the Hon. Nathaniel C. Smith, member of the Assembly from Cape May County, for becoming interested in our cause, drafting, introducing, and successfully piloting his Bill through both Houses. We also

extend our sincere thanks to Hon. Anthony J. Caferio, State Senator from the same County, for his full support and cooperation. Further thanks are extended to YAO for his efforts in interesting his Assemblyman in this cause and to MM, MMG, IIN, MUP, ZBY, VQR, NKD, SOX, and others who spent a great deal of valuable time and energy. CCM is Acting NCS for N. J. Emergency Phone Net. Those interested in a 100-meter phone net, please QSO URS. ORS is an 00. Traffic: W2ZVW 194, ORS 126, AKB 9, ASG 8, ZYK 7.

WESTERN NEW YORK—SCM, Harding A. Clark, W2PGT—SEC: SJV. RM: RUF. New officers of the Elmira Amateur Radio Assn. are HQY, pres.; FE, vice-pres.; 3BH, secy.; UEE, treas. OVP uses independent power in all emergency net drills. EMW worked TI, ZL, G, and ZD4 with 60 watts on 3.5-Mc. c.w. TF has resigned as EC for Essex County and has moved to Florida, where he will hold the call 4TV. ZYD is new EC for Essex County. VEY is new EC for Wayne County. TBD spoke to the Rochester VHF Club on antennas and SJV spoke on emergency nets. The KBT Club held its annual auction and PPL spoke on novel designs for 3.8-Mc. mobile rigs. New officers of RAWNY are YVS, pres.; SJV, vice-pres.; TKO, corr. secy.; KZ, rec. secy.; and AYA, treas. UZB is in charge of radio facilities at Buffalo Veterans Hospital. Erie County 10-meter net has good attendance. PGT made WAC on 3.5-Mc. c.w. in less than three hours. The Rochester Emergency Net gang demonstrated amateur radio emergency communications to Rochester c.d. officials. The Tompkins County gang has a nice tie-in with the sheriff's department. EHD and OE sent in first traffic reports with nice totals. New York State Civil Defense Net started operation April 10th at 1900 on 3509.5 kc. and will continue to meet every Tuesday evening. RUF now has 3.8-Mc. phone available and will join in the 'phone c.d. operations also. LRW, NVB, COU, TYC, and RUF now are MARS members. RUF requests that the EC in each county make an effort to QNI into the c.d. net every Tuesday. BTB is secretary of the Syracuse Emergency Radio Communications Association, which has done commendable work for the Red Cross. She and her OM, ZOL, deserve much praise for the help they are giving hams-to-be and people who wish to get in touch with their loved ones overseas. Their shack at Fayetteville is always open to visitors. Traffic: W2RUF 696, DJF, 114, EHD 77, SJV 63, BLO 50, DPL 50, OE 50, PGT 35, RUT 37, FCG 30, ZJ 30, ZHU 10, EDM 7.

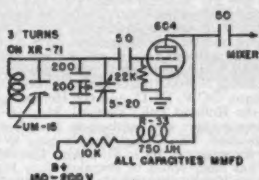
WESTERN PENNSYLVANIA—SCM, Ernest J. Hlinaky, W3KWL—SEC: OMA. PAM: AER. RMs: NUG and GEG. The Radio Association of Erie sent in loads of clippings taken from its weekly paper editorials on the Erie hams. One item of interest told of a radio hobby club, composed of a group of hams working for Erie Resistor Corp. QWL, LKH, QFE, TEX, LKH, QKT, QFP, AXM, WBA, SER, PCB, and NEB make up the group. Another article on Field Day was well written by PIX. How about your club appointing several members to report into the WPA traffic net on 3855 kc. at 7 p.m. each night and 'phone nets on 3.8 Mc.? The Steel City Amateur Radio Club's fine editorial staff includes DNO, NKM, MPO, RXT, RIK, and NRQ. OKU worked Wales, was heard in England, and heard Liberia on 160 meters. The Amateur Transmitters Assn. is scouting for new club members. Congrats to KUN and UHN, who have been appointed as ORS. KUN is ex-8KUN, formerly of Homer City, Pa. The Western Penna. Traffic Net has been averaging eight stations per session. Reporting consistently are NRE, NCD, MIZ, LEV, UHN, KUN, KWL, GEG, and NUG. Also making it are QVL, MIE, EQD, and LOD. One thing is sure, and UHN will agree, it's a great feeling to deliver a message from a non-overseas to his mother and have her call long distance and thank you with all her heart. ODU reports working on a new 'scope. LOD again is active. IYR has a commercial 1st-class radiotelephone license. MOT says activity in Dubois is picking up with five stations on 28 and a few on 7 Mc. At State College, MLN, Professor of Electrical Engineering, reports building a television system for experimental purposes. ODB is operating the Scott Field transmitter with the call 9FAE. He can be heard on 3587 kc. The Allegheny-Kiski Radio Club net meets each Monday at 9 p.m. LPQ is Acting Net Control. KUN reports that he has work 36 countries on 3.5 Mc. this past winter. Traffic: (Mar.) W3NRE 637, NUG 109, NCD 68, UHN 55, KWL 24, MIZ 15, LEV 10, LOD 5. (Feb.) W3NUG 70, LSS 21, AER 5, MOT 4, IYR 2, LOD 1.

CENTRAL DIVISION

ILLINOIS—SCM, Lloyd E. Hopkins, W9EVJ—Section nets: ILN, 3515 kc.; IEN, 3940 kc. SEC: QIZ. PAM: UQT. RM: BUK. UCN managed to save most of his rig

when his home turned recently. KNP, a former W8, returned to the air from Chicago to KJH. KRH is in the traffic business and hot after ORS. LMC has 46 netates on 7 Mc. SXL reports 20 stations in the Central Illinois Net on 1815 kc. KJ, QN, NHD, YUC, and YIX are new members of MARS. JJO is troubled with a balky WFO. NIU is getting ready for 160 meters. IMX finds working the second shift has reduced activity for him. NN is finding DX poor on 14 Mc. KQL hooked a K17 on 3.5-Mc. e.w. The Iroquoia Radio Club and the KKK Radio Club are planning a contest for this month. JMG moved to Park Forest. GDI spent his time trying to make the rig TVI-proof. CMU is back in the hospital because of a heart condition. LNI purchased a new car and is planning a mobile job. HOV reports the Hamsters picnic will be held Aug. 12th near Frankfort, Ill. in the same spot as last year. KJ is shopping for an HRO-51. ZSN installed a homemade harmonicker with very good results. QBJ sends news of the North Suburban Club. OLU in the Army is a ham and has drawn the assignment of running E44WC. Wedding bells soon will ring for TO and RRV. QKM now is portable in the 3rd district. YIX acquired an 8005 bottle and 1500-volt plate transformer. ODT found it necessary to resign as EC for Will County after many years in that post. APK is in the Army Signal Corps at Camp Gordon, Ga. Remember the Starved Rock Hamfest on June 3rd at the usual place. MEM is holding down the Elgin station outfit in a gentlemen's club. A cartoon is produced as usual twice a week in a nation-wide cartoon which is produced by IMQ. HHH will move to Nebraska shortly to take a new job. F. E. Handy, 1BDI, is making a tour of many cities in our section as this is written. ILH again is high in the section traffic totals. Your SCM asks that you be patient if you don't get an immediate answer to your requests as mail is very heavy. Traffic: (Mar.) WO1H 1068, PE 227, PEK 708, KQL 191, KRH 175, YIX 162, SXL 88, KJ 77, QN 77, NHD 77, YUC 77, YIX 77, IMX 77, LMC 77, LAX 36, LHM 26, EDW 26, FRI 15, HOV 13, SMC 12, FRP 11, ZSN 10, IMX 8, HKA 6, NN 6, BGN 2, GDI 2. (Feb.) WO1P 323, KJ 22.

SGG has new 75A-2. VKS moved to Milton Junction from Chicago. 8ELR now is MNI at Milwaukee. LAG is active on 1.8 and 28 Mc. with 813 final. OO PFK cited WWV for being 5 minutes off on voice time announcements and received verification! Traffic: W9ESJ 551, MQV 348, IXA 300, BVG 249, CBE 216, IQM 135, DR 39, PFK 39, HDZ 38, ANM 33, RQM 28, CWZ 22, UIT 18, IVE 17, FXA 13, ELY 10. JGG 10. IQW 8. OVO 5. IHW 3.



WITH the current interest in mobile work as a result of TVI and increased effort or interest in CD work, have come some problems not entirely new to most of us but, nevertheless, ones which require a slightly different approach. One such problem is the stability of the local oscillator in the mobile converter, of the type used with a regular automobile broadcast receiver, especially on 10 meters. I know the construction of

the converters is all too often left up to the manufacturers of amateur equipment, with the consequent loss in about 50% of the fun. For those few who do build their own gear we take off our hats and continue. The problem of oscillator stability is especially tough in a mobile installation due to the wide variation of filament and plate voltage coupled with the variation in ambient temperature. In addition to this the oscillator must be able to take a certain amount of shock treatment. A converter has been constructed which has exceptional stability. The complete tube lineup is more or less conventional, 6AK5 RF, 6BA7 mixer, and a 6C4 oscillator. All stages are tuned with a condenser made by ganging three National Type UM-15 condensers together.

The converter built previous to this was a broad band affair and suffered from instability not only connected with voltage and temperature changes but connected with the ability of the mixer and even the antenna to pull the oscillator frequency. The ten meter band is wide enough so that if the RF section covers the band it also covers the oscillator frequency, a condition which is extremely bad from the standpoint of pulling. In our case, the antenna movement even changed the oscillator frequency. For this reason, the second attempt called for a ganged tuned converter.

The oscillator used in the second converter is a 6C4 connected in a Colpitts circuit with two 200 mmfd. silver mica condensers, connected in series across the oscillator tank. The center point of the two 200 mmfd condensers is grounded along with the cathode of the 6C4, the ends of the tuned circuit going to the plate and grid. One of the most serious causes of frequency shift is the change in cathode to ground capacity as a result of change in filament voltage. This is, of course, eliminated if the cathode is grounded. With the circuit arrangement outlined, 200 mmfd appears from grid to ground and 200 mmfd from plate to ground swamping out the changes in tube capacities due to voltage changes and at the same time providing about 100 mmfd. minimum capacity. The UM-15 across the entire coil tunes 28 to 29.7 mc. with about 5 degrees of leeway at the ends. The RF and mixer sections can be padded with 75 mmfd fixed ceramic condensers to bring the minimum capacity of these sections including the trimmer and circuit capacity to about 100 mmfd. This allows the use of the same size tuning condenser in each section and perfect tracking over the narrow band can be obtained by slightly bending the plates for maximum background noise. With the tubes used no sacrifice in sensitivity was made to allow the use of higher C circuits. The stability of all stages was improved and the signal to spurious response ratio was increased. The thermal stability of the oscillator is excellent, due partly to the use of one of the new National XR-71 ceramic coil forms. General Rules to remember are, use quality components in the oscillator at least, avoid injection of the oscillator into the signal grids, gang tune the stages and don't try to arrive at the lowest minimum capacity possible.

Another problem in mobile work is the elimination of electrical noise in the car. In connection with this, one of the best methods of eliminating noise in low current circuits is to tune a National R-60 2uh choke with 5-20 mmfd variable ceramic condenser to ten meters and connect it in series with the lead at the noise source. Common sources are voltage regulators, gas gauge indicators, temperature gauges, and generators. The latter will require a much larger coil capable of handling the armature current.

ED. HARRINGTON, W1JEL



he also worked CNEJ on 3.5-Mc. c.w. LXX, in Schriever, and LDH, in New Orleans, are both calls of Phil Slipakoff. YU, Tulane University, has a new 28-Mc. rotary. DXL and JET are new Class A hams in Monroe. PVE and PUF raised their Class C to a Class B status. LNU, operating USN, led the State in the 5S. USN puts out all WIAW official bulletins by tape at 12:30 p.m. Mon. through Fri. on 7100 kc., and at 7:30 p.m. Fri. through Mon. on 3550 and 7100 kc., simultaneously. Candidates for novice and other licenses are invited to consult or write CNG. HHT has an FB complete small portable station. LVG continues as the most consistent 3.5-Mc. traffic outlet for Crescent City. AXD works over the entire Delta Division with his 3.5-Mc. mobile. HEJ and his XYL HEK, stay in contact all over the City of Monroe and Northern Louisiana via the HEJ mobile and the HEK 30K. EB has begun taking on his annual load of G.I. traffic from the Pacific. KUZ has resumed activity and is a member of MARS. Traffic: W6NG 186.

MISSISSIPPI—SCM, Norman B. Feehan, W4JHS—K5FBB have their beam fixed and are working DX again. RUT has new beam and QTH. LPL has been transferred to Gulfport. SJD is on his way to his new QTH and was worked in Arizona on 28 Mc. making 80 m.p.h. OOT was home on leave. NYV is back on air after a long absence. BSR, ARRL Director, presented the Gulf Coast Club with its ARRL Charter. SCE has completed adjustments on Clemens Match for the 400-watt rig. He is working 10-meter aeronautical mobile with a home-brew power supply for using the tri-band Gonset and ST203-A on 28 volts. SPK is using control carrier and sounds swell on 28 Mc. SKA/M and RGC/M are trying to work ZSs on 28-Mc. mobile. WZ, EGE, QMQ, and IGW check into more traffic nets than any other stations in Mississippi. Traffic: W6WZ 308, JHS 202, QMQ 91.

TENNESSEE—SCM, D. G. Stewart, W4AFI—New SEC is AEE and RM is BAQ. Good luck to FDF in his new venture in California. NNJ has accepted new duties conflicting with his operation. Thanks, Jack and Wade, for a job well done. The Kingsport Amateur Radio Club set up a station at the Hobby Show and accepted traffic to servicemen, operating under the call OLM. PL is back in the saddle after an extended vacation earned in his customary traffic total. Others making BPL were NJE and OGG. NJE worked 23 new countries in March. NNJ visited APC for a fishing session. CXY is operating as portable from Waits Bar and trying his luck at angling. AEE has completed 50-Mc. Oak Ridge converter. LUH is building a new kw. front end for the Collins. HQM meets Hub-City 28-Mc. Net. JNT lost his skywire. FLW has 3.5-Mc. mobile going again. The Memphis Ten-Meter Emergency Net meets at 1900 on 28.6 Mc. with AQR as NCS. The mobile section meets on 29.627 Mc. with ten units reporting and an expected ultimate of eighteen. The Mid-South Amateur Radio Club was host to Adm. Cunningham, Ret., Dir. of C.D. for Memphis. BAQ, EM, EYO, ILY, LVG, ODN, and other non-amateur operators were guests of honor at a dinner given by Illinois Central R.R. and were presented with medals of honor in recognition of services rendered during the January-February ice storm. Traffic: (Mar.) W4PL 1258, OGG 502, NNJ 378, APC 147, BAQ 104, IIB 79, AFT 35, CXY 35, AEE 32, FX 30, NNH 30, OOA 25, LUH 20, JNT 10, HQM 18, PMR 14, NDC 12, RMJ 11, RDK 10, HHQ 5, NPS 2, RHO 2, FHP 1, (Feb.) W4NJE 415.

GREAT LAKES DIVISION

KENTUCKY—SCM, I. W. Lyle, Jr., W4KEG—RQV, at Fort Campbell, is a welcome addition to KYN. ERP, on 7 Mc., is handling lots of traffic. OXC, 144-Mc. operator, is operating all bands and experimenting with 420 Mc. CMP is working out FB with mobile rig. KZF, of Erlanger, says SMU is a new ham with an antenna strung between two church steeples! OXT, U. of L. student, back from co-op training in Columbus, is ready to go again. K4WBG, big gun on KYN from Knox, puts out nice signals. 8ZKK and 8RCN also are operators there. KQI, Great Lakes Assistant Director, has a new 7-Mc. rig. VP has new Collins 75A-2. LDW, of Lexington, prepared for an emergency. MWX is a hard-working RM and an active participant in TLJ-9RN. OGB also has 75A-2 on the way. JQV helped on MWX's new antenna. RYM and NUQ are mobile rig experts. BAZ is rebuilding his entire rig. MQ, PAM for Kentucky, is quite active in all phases of amateur radio. DTI is quite active. YPR's activities have been curtailed because of the illness of his wife. The traffic total as BXU is picking up. NBY reports in on KYN. KYB and KYC. PRT is pretty busy but gets on some these days. MVL ran up a nice traffic total. MGT is traveling around the State and lining up Emergency Corps stations and Emergency Coordinators. CDA is RM and reports in on TLJ-9RN, plus KYN. Traffic: W4BAZ 306, MGT 273, ERP 193, MWX 155, WBG 152, XKB 105, MVL 94, OGB 50, MDB 48, CDA 46, NBY 46, KKG 31, BXU 26, CMP 24, MQ 22, PRT 11, OXC 10, DTI 8, RQV 8.

MICHIGAN—SCM, Norman C. MacPhail, W8DLZ—Aust. SCM (c.w.): J. R. Beljan, RSCW. Aust. SCM (phone): R. B. Cooper, SAQA. SEC: GJH. PAMS: YNG and TTY. RMs: UKV and YKC. New appointments in-

clude ORS to YDR, EGL, WVL, DQI, DOI, and ZLK; OPS to TIC, UGD, QBO, ATB, LR, and JUQ; EC to JYJ for Washtenaw County and TNO for Oakland County; OO (Class III and IV) to DXA in Algonac. Interest in c.d. work, emergency preparedness, and traffic, as evidenced by the growing list of official appointments, continues to increase. Michigan was the first state to issue automobile license plates with amateur call letters. A state-wide movement is under way now to make it again possible. Radio clubs are petitioning representatives to introduce the proper legislation at once. GCW, DED, and the Holland gang had a rig going at the Holland Tulip Festival, May 16-19. EGL and SCW welcome ideas and stations to the 40-meter net now being organized. The Grand Rapids gang is building ten 144-Mc. transceivers for c.d. work. The Michigan 'phone picnic has been voted to Petokey July 8th. (C.w. men are welcome if they promise to hold conversations to 10 words per minute or less.) Jackson boasts a new 28-Mc. emergency net. TTY reports HPH has moved to Detroit and FWG has a new 300-watt on 7 Mc. in the U.P. HKT says the little 40-watt in Jan. QST really does a great job. The Cherryland Radio Club now is sharing converted barracks with the CAP. Officers are ZWM, pres.; SRV, vice-pres.; SYQ, secy.; and ZLK, treas. YKC now is on 28-Mc. mobile. The TLS Net has been reactivated on 3545 kc. at 1900 EST. EXZ is haunting the low end of 7 Mc. working DX with 30 watts. FX soon will be mobile on 3.5 or 28 Mc. WFO 97, TZD 91, WVL 84, QXJ 83, UGD 68, DAP 65, EXZ 55, DLZ 40, YNC 38, SFB 36, WVB 24, AQA 33, FX 33, COW 31, JUQ 29, TQP 29, HUG 24, TUX 24, DQI 21, ILP 21, OAF 21, DOI 19, UGR 19, MHH 18, ZEE 18, YMO 16, EJD 14, DSE 10, FWQ 7, DED 6, QIX 5, 88Z 5, TIC 5, TTY 3, YDR 2, FBJ 1. (Feb.) W8RYP 139, UKV 132, SWG 94, SCW 92, YNG 59, DOI 57, EJD 45, COW 42, DQL 26, YDR 8, YMO 8, TIC 7.

OHIO—SCM, Leslie Misch, W8HGW—Aust. SCMs, C. D. Hall, 8PUN, and J. E. Slinger, 8AJW. SEC: UPB. RMs: DAE and PMJ. PAMS: PUN and AJW. New OOB appointees: DL, NBB, PEN, and YJE. YCP and DAE again make BPL. DAE registered his all-time high in total points. EIV is doing a good job with 7-Mc. traffic. CCO, club station of the NEARC, has a new HRP-9 transmitter and emergency gas-driven generator. PAU now has worked 110 countries. Ex-EKJ now is FRD. PBX now is on 160 meters in an effort to alleviate TVI. YCP has upped his power to 250 watts. DXO has received DXCC (phone) Certificate No. 355. ZJM has a new two-element beam for 14 Mc. PBZ has resigned as EC for Cuyahoga County. We are sorry to see him leave and hope that Pete's replacement will be able to carry on in the same efficient manner. From *Shack Gossip* we hear that several Toledo operators worked BN while the latter was vacationing in Arizona. New TRC officers are WEW, pres.; CRA, treas.; TKS, rec. secy.; and YGR, corr. secy. The Toledo Red Cross Mobile Emergency Net is on daily from 9:00 a.m. until midnight. CPA, WRN, and UZ are busy in the development and organization of the 2-meter c.d. project in Columbus. JRG has a new 75A-1 and now is in there plugging with the other DX boys in the region; namely, BTI, JIN, WZ, NBB, JNF, and 4FU. Flash! The *B.N. News Bulletin* has resumed publication after a year's absence. Forty-four of the regular net reporters are listed in the *BNNB* in addition to other items of interest. The *R. F. Carrier* of Dayton informs us that YEV is in the Army, and that the supper meeting of March 30th, despite a few cases of indigestion (brought about by over-eating), was a huge success. Your SCM and QSL Mgr., NGW, attended the Intercity Radio Club Hamfest at Mansfield on April 6th. More than 100 were in attendance and reports on the whole were so favorable that plans are already being discussed for the next. The Q6 of Springfield informs us that EWU, EPA, and EOY obtained their Class A tickets, that TVI is now at a minimum because TV EYE has become popular among the club members and that EQN is the uncrowned chess champion of the club. ZQU is the proud father of a brand-new bouncing baby boy. YGR has just worked his 80th country with the BC-459. TKS is radio officer for Lucas County c.d. set-up. It was necessary that 25 appointments be cancelled during the past month, because of non-reporting. There are, needless to say, numerous openings for OOB, OES, QPS applicants and the like. Write your SCM if interested. Traffic: W8DAE 456, IB 350, YCP 283, DZX 197, ARO 119, UPB 95, GZ 96, CBI 47, WAV 39, AL 35, EQN 35, EZC 35, SFT 33, PUN 31, QIE 29, WE 11, AJW 10, PR 9, DXO 8, LCY 6, DZO 4, ET 4, EOW 3, LBH 3, WAB 3, ZOF/43, AQ 2, ZJM 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Sleeper, W2CLL—SEC: NJF. Your SCM has appointed BGO as Regional Coordinator. He will be responsible for coor-

(Continued on page 78)

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Cat. No.	Material	Height
135-20	Steatite	1 1/4
-22		1
-24		3/4
135-22J	Steatite, jack type	1
-20J		1 1/4
135-503	Steatite cone	2
-500		3/4
-501		1
-502		1 1/2
-504		2
135-66	Porcelain, metal base	2 3/4
-67		4 1/2
135-68	Porcelain, metal base	2
-65		1 1/4
135-42	Steatite	3/4
-40		1 1/4
-44		3/4
135-42J	Steatite	3/4
-40J		1 1/4
135-50	Steatite	1/2
-51		1 1/4
-52		1 1/4
135-53	Porcelain*	1 1/4
135-54	Porcelain*	4
135-90	Mtg. flange for 135-53	
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minating AREC activities in the three sections of the Division with respect to the use of amateur facilities by the State Civil Defense Commission. The State C.D. Commission subsequently appointed BGO Communications Officer in charge of the Amateur Radio Division of the State Civil Defense Commission. All inquiries and other matters pertaining to c.d. activity should be directed to W2BGO, New York State Civil Defense Commission, 124 East 28 St., New York 16, N. Y. RMA and KLZ worked crossband 420 and 144 Mc. 20 miles. Congrats to LRW, now DXCC. EC drills in the section are being maintained. HUM reports a splendid meeting in Columbia County. The meeting was attended by ILL, the Asst. REC. CTV was guest of honor at the April meeting of the SARA. BNC certainly is stepping up QTC activity. 8G8J/2 really is putting Saugerties on the map with his trafficking. PHO has found it necessary to resign from the management of NY88. KBT is the new manager. PHO did a magnificent job in developing NY88 into the outstanding net that it is. SNN reports a big influx of members into his AREC group, and a successful demonstration for c.d. officials. HF received a nice newspaper write-up for AREC work in Putnam County. New appointments: FQL as EC for Greene County, JPK as EC for Lorchmont, K2CA as EC for Newtonville, YEX as EC for KBT as ORS, ILI as PAM for 144 Mc. Endorsements: ILI as CO, PHO as ORS. Traffic: W2BNC 478, TVC 215, W8SJ/2 167, W2KPT 47, CQ 41, BNC 37, NYB 29, CEV 18, CLL 18, PHO 15, SNN 9, ANB 7.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, W20BU — Asst. SCM, Harry Dannels, 2TUK, REC: BGO. RM: TUK, PRE. The ECs are holding regular drills on 28 and 144 Mc., with low-frequency stations reporting into the New York State Civil Defense nets on 3995 and 3500 kc. in regular drills. The Asst. REC, EC, has added three new stations to his 29,492-Mc. net. A hidden transmitter hunt was held, with EDR handling the long-haul job. In Nassau County, work is progressing rapidly with 144-Mc. drills now averaging 35 stations. In the area covered by KTF, active nets operate on 3910, 145.05, and 147.3 Mc. SYW, Queens EC, has appointed DHN as Asst. EC, working in the Fire Telegraph Bureau. Flushing Heights has been included in portable station operation, with PAG/2 working on 144 Mc. Staff doctors are the operators and more operators are needed to man this station during emergencies when the doctors have their hands full with other duties. Drop a card to SYW. IAG, EC for 10-meter net, asks all mobiles in Queens operating that band to join the AREC 10-meter net. Late session is at 2300 on 29,520 kc. In Brooklyn, BIV, the EC, has swelled the total of AREC stations to 103, 30 mobiles and 73 fixed. YHS and CHS are new NCAs for 144 and 28 Mc., respectively. In Islip Township, AJF says conditions are better with a new antenna on the Town Hall. Suffolk mobiles AJF, WDP, PIA, NXZ, SAH, LCU, DTF, and BEF make up this local net on 3995 kc. The Smithtown 10-meter net is established with a headquarters station in the Town Hall. Also in Suffolk, KNA replaces ZTS as NC for the county-wide 2-meter net operating on a calling frequency of 146.8 Mc. The North Shore operates on 147.0 and the South Shore on 147.15 Mc., all crystal-controlled. All who contemplate AREC/c.d. operation in the east end of Suffolk, please contact HCA. County-wide drills on 3995 kc., with information gatherings by Asst. ECs keep the County well informed. Stations in Suffolk in the NYSCD are PZE and KDB. TUK, RM for the NLI traffic net operating on 137 kc. at 1930 Mondays through Fridays, reports 30 different stations QNing into the net during the month. The Nassau Radio Club has fifty students in its radio school. The Mid-Island Club is the eighth club to join the FLIRC. The T-Boro Club is considering /MM operation for Field Day. BGO resigned the post of radio aide for c.d. in New York City to assume duties as Regional Coordinator for the N. Y. State C.D. working with CLL in Albany. NNS attended fifteen net drills and earned a Section Net certificate. BPV is in charge of communications at Floyd Bennett Field. EME, only 16 years old, received his Code Proficiency certificate for 35 w.p.m. PF is busy revising MARS Net schedules for the 1st Army Area. MQB is building up good traffic scores these days operating in TCNP daily. EC purchased a TV set with a new antenna 15 feet from the transmitter running 400 watts on 3.5 Mc. and no TVI. CSO is back DXing after a two-week Naval refresher cruise. DIC joined the Sunrise Club, qualified for Class A and 3rd-class commercial tickets, and received MARS appointment. RWQ is back on 14 Mc. OUT is using clamp tube 'phone at 200 watts and 400 watts c.w. with a new pair of 4E27s. IN worked for ORS and OPS appointments. GP, by activity in the NLI Net, received ORS appointment. AHC received OO appointment. All OO appointees are requested to forward monthly reports to your SCM instead of direct to ARRL. Traffic: W2BO 786, VNJ 309, EC 214, RQJ 145, GP 141, OBU 128, MQB 99, OUT 58, JQB 45, TJA 19, TUK 14, UGZ 13, IAG 12, CLA 10, DIC 7, KTF 5, IN 4, PF 4, VKF 3, ESO 2.

NORTHERN NEW JERSEY — SCM, Thomas J. Ryan, Jr., W2NKD — As this is being written we await the Governor's signature on the Bill which puts into law the authority for our call letters to be used on automobile registrations and license plates. More appointments have been made to place an Emergency Co-ordinator at the head of each lo-

cality's radio group. During the month the following men were given official status: OGP, Upper Saddle River; WCW, Hoboken; CYB, Freehold; DCP, Matawan; NDU, Bradley Beach; BDL, Lakeland Area of Morris County; CGS, Hillsdale; EUL, Roselle ALK, Cranford; PIX, Elizabeth; FLP, Clark; KOG, Scotch Plains; LSX, Kew-Forest; and PHD, Union. An orchid is due VQR for his organizational work in New Jersey. Following his appointment on July 26, 1950 as SEC of Northern New Jersey, Lloyd began immediately to put together a machine the like of which cannot be found in any other section. Then with the outgrowth of civil defense, his responsibility was state-wide. The section net, JN, has moved to 3700 kc., the former frequency of the S.N.J. Net. It still meets at 7 p.m. EST nightly except Sunday. The N. J. Slow Speed Net continues to meet on 3630 kc. at 7:30 p.m. EST. OGP, in his first week as EC of Upper Saddle River, had a local full-fledged emergency on March 30th following the heavy rains in Northern New Jersey. Quick work brought into play the AREC fellows and they performed great work in evacuation and in establishing communication for the public utilities and services. OGP was aided by CGJ, SVS, IZH, FHJ, and GNQ. NQA now is on 144-Mc. mobile. UK is Field Day chairman for the Raritan Valley RC. FFY is the new call of ex-IQNT in Metuchen. Thanks are due LQP as one of the Net Control Stations on JN. He left the net to begin working the night shift. CZA notified the 28-Mc. and 144-Mc. nets of the fact that Summit Red Cross HQ, BTS demonstrated ham radio to the students of the Long Branch Jr. High School, including a QSO with NOZ, the senior high school radio club station. CWK is up to 87 counties worked. DCP converted a 522 for use in the Matawan police station. AJA and SOG are new members of AREC. LOP and WCC are teaching code work theory to Boy Scouts in Roselle Park. The Cornfield RC held its annual dinner March 28th at Robin Hood Inn. VE3WY, one of the steady customers on TLAP, visited ANG. COT received WAC certificate. Bruce also has worked 725 different stations on 144 Mc. CZA reports the c.d. appropriation has been approved in Summit. OUS transmits ARRL bulletins on 146 Mc. at 6:15 p.m. EST on Mon., Tues., Thurs., and Sat. Clubs, please send advance notice of Field Day location. Traffic: (Mar.) W2CS 25, CUI 202, LMB 150, CGG 124, EWZ 112, WCL 72, NCY 68, ANG 50, DRV 23, CWK 22, CJX 18, OXL 10, COT 6, OUS 6, CFB 4, OGP 2, ZEP 1. (Feb.) W2CZA 38, OUS 11.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W9PFF — SCA again I has made BFL. We have a new ham in West Branch; he'll be on 3.5- and 7-Mc. c.w. signing CUK. During our heavy snow the last Sunday in March the Iowa 75 and Tall Corn Nets were alerted and standing by for service. Fortunately we were not needed, but it is to be noted that Iowa is ready. TEN is ready for traffic for any state as well as Germany and Pacific Islands any night, including Saturday and Sunday. QVA reports two new members on TLIC, namely CDB, Marshalltown, and NFL, Dexter. ATA is closing down getting ready for college at Ames in June. The Iowa Great Lakes Amateur Radio Club is unique in that it started with a membership of 40 with only two holding ham tickets. Since then four members have received their tickets and a big delegation recently went up for tickets. The Council Bluffs Club's bulletin, Sparks, tells me that QZF is now at KMTV, UUV is at KOIL transmitter. PG is home from the hospital. UTF and QHK are on quite a bit from K5FAC. Your next news will be from your choice for SCM for the new term. It has been a pleasure to serve you fellows even though the service hasn't been what I consider satisfactory. I want to thank you all for your cooperation. The job of SCM cannot be successful without it. Traffic: (Mar.) W9SCA 707, QVA 197, ATA 99, NYX 97, YTA 88, LAG 15. KANSAS — SCM, Earl N. Johnston, W9ICV — On June 10th the Central Kansas Radio Club will hold its picnic at Kenwood Park in Salina. PKD has a new 35-foot pole with 50- and 144-Mc. beams. ATS has new 30-foot tower with 28-Mc. beam, also a new VHF-152. BDK is a newcomer to the 144-Mc. gang. JFE, Abilene, replaced a blown 829 with a pair of 2-26s on 144 Mc. High winds took NBC's 28- and 144-Mc. beams down. BOW now has a set up on 144 Mc. INW is back on 144 Mc. BYC, of Burden, reports the organization of the Southern Kansas Amateur Radio Club with PPV, pres.; NJS, vice-pres.; BYC, secy.-treas. NJS is working for Boeing. OZK and HWN are active on 144 Mc. CQM has new 8X-71 and Harvey-Wells Bandmaster. A new club has been organized in KCK with ZGK, pres.; AHC, vice-pres.; FIE, treas.; KXL, secy.; HVS, 44 Mc. arms. A demonstration of the operation of the 28-Mc. mobile net was shown to c.d. officials at City Hall recently. Meetings are held every other Thursday at City Hall KCK. The Missouri Valley Net now has 21 members with 14 portable rigs. QQQ, at Manhattan, originated 124 messages during Open House March 16th. AHM, of Manhattan, has 200 watts to 4-65A bandswitching and less TVI. ELD, a new mobile on 3.5 Mc. in Topeka. We regret to add ETS, of Goodland, to the list of Silent Keys. He formerly was president of the Great Plains Radio Club. Traffic: W9FDJ 195, QQQ 168, WGM 65, MUY 38, BLI 27, VBQ 26, GHR 22, FEL 20, BNU 14, ICV 9, ALD 7, LIX 1.

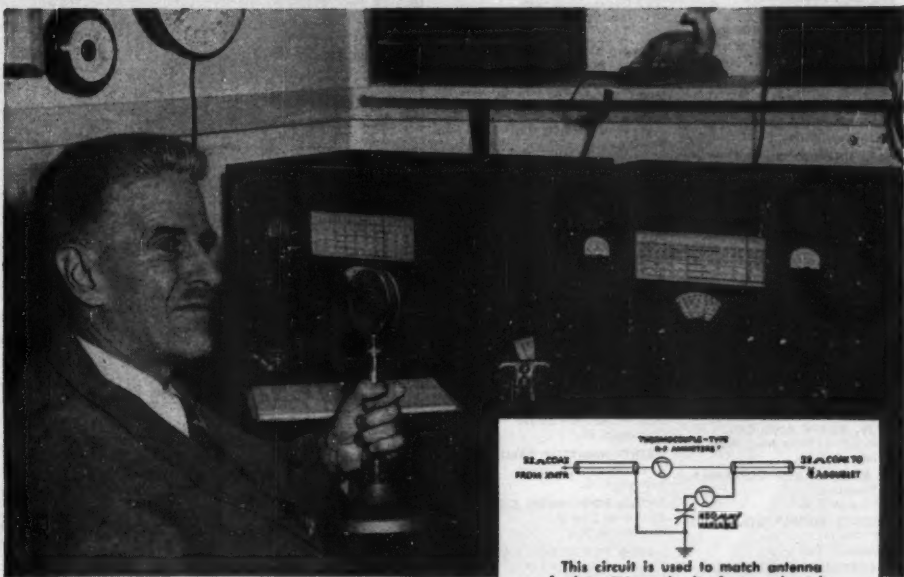
(Continued on page 80)

NENBASKA -- SCM, Scott E. Davison. WOED -- BZC is really DXing with 12 countries added the past month. KNT has new 815 rig on c.w., all-band, AY, TQD, and RYG banged out BPLs this month. That's eight in a row for AY. AYO is riding the waves on an LST. AIN reports from Korea. The NENRC is holding a hamfest in Norfolk the first Sunday in June. QG reports from the BBX. XYL is now CSN. QHG has a pair of 810s on 3.8 Mc. JFX runs 12 watts on 3.8 Mc. YWK has nice signals on 3.8 Mc. APK has new 813 rig and QGB has a new 814 rig. OAO is sporting a brand-new bride. JLD popped the question, too, and says he'll be on the air soon. BXJ is busy with TVI research. DMQ, BDQ, and FLF all have their rigs for sale. HVR now is in California. OLC has 144-Mc. rig ready for sale. QG has a 144-Mc. rig for sale. QG has a 144-Mc. rig with the SCM recently were APK, JDJ, RYG, JED, and BXJ. HWM and UZF are new ECs. AYM reports for the FB SENRC. Her hubby, MYT, says the new QTH is Union. OWR has changed QTH to Plattsmouth. JED held an EC meeting in Fremont recently. The film, "You Can Beat the A-Bomb," was shown the group. Incidentally, gang JED holds EC drills at 9 p.m. Mondays. Don't forget to get the Stanton the 144-Mc. rig for sale. 3 Mc. rig, WFTQD 055, 138, 167, RYG 005, LXL 156, LA 155, DMY 52, JDJ 45, JED 43, OED 43, FMW 39, LJO 38, ZIF 28, QGB 26, HWM 11, BZC 4, IDR 4, ERW 2, KNT 1.

MAINE, KES & AQL are **WVH** and **W. H. Keill**, **WVH** Nets: Pine Tree, AEC, Seagull, Southern Maine **VHF**, all functioning as per schedule. **PAWA** supplied communications for the fourth year for the Portland Boys Club Annual Road Race on April 19th. The **PAWA** will sponsor the Annual Downeast Hamfest at Portland on July 28th at the Eastland Hotel. Tickets are expected to be the same as last year, \$3.50 each. Contact the club president, Donovan A. Robertson, ITU, 631 Cumberland Ave., Portland, Maine, or place messages on TCPN, Seagull, Deepsea Dragnet, Pine Tree, or AEC Nets. The first amateur gathering was at Mount Desert Island, at the Summer Club, on 6/24/81. **QEE** and **QED** this year took the top spots. The Western Maine Radio Club of Bangor held a roast chicken dinner April 14th with a very large attendance. **AQL** grinds out Official Bulletins on 3650 kc; **LBJ** is eastern anchor for TCPN in the early A.M.; **KES** is a new AEC member in Woodland; **QEE** has

WESTERN MASSACHUSETTS - SCM: Victor W. Paonoff, WIEOB - SEC: JYH, RM: BVR. Net frequency is 3725 kc., Mon. through Fri. 7 p.m. and 10 p.m. Slow speed net meets Mon. and Fri. at 6:30 p.m. AREC organization is progressing rapidly under the guiding hand of JYH. Net ECs are STR, COL, GZ, ODS, DYP, BCT, GUI, NIL, LLN, GJO, LFI, and GKK, bringing the total to 36 for our section. The Governor of Massachusetts has appointed JYH to the National Council of the American Association of their respective e.d. regions. BDV is organizing and one terminal of a net set up to handle traffic for his high school students who attended the music festival in Augusta, Maine. MUN made outstanding readings in the February FMT with an average error of 1/2 part per million. Excellent results also were reported for IHI and MBL. BVR was guest at annual hamfests of the Tri-City RC in Norwich, Conn. and NCRG in Springfield. COL is almost ready to resume activity. JYH is planning to increase his traffic totals and is high man this month. OCT has new 144-Mc. mobile. TAY, TDG, and OJK are sporting 28-Mc. mobile rigs. GZ is NCS for three AREC nets in region No. 9. LFI and GUI are e.d. comm. Directors for West Boylston and Lancaster, respectively. RVW is moving to Springfield. NLE has new 829 final perking on 144 Mc. OJK is joining an FB job with *Zero Beat*, the monthly bulletin of the Connecticut Radio Club other than the monthly section. Acquisition of a TV set is apt to curtail activities of Ye SCM unless the "Minus" doesn't get any more than promises of action! RO is organizing 28-Mc. net.

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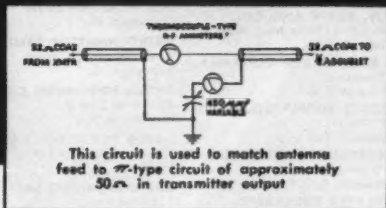


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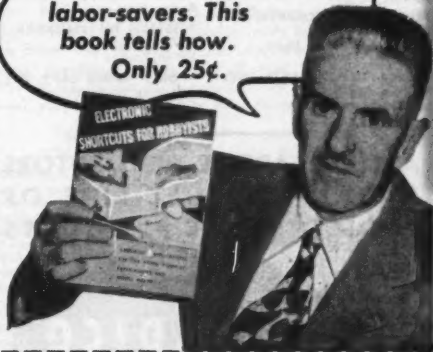
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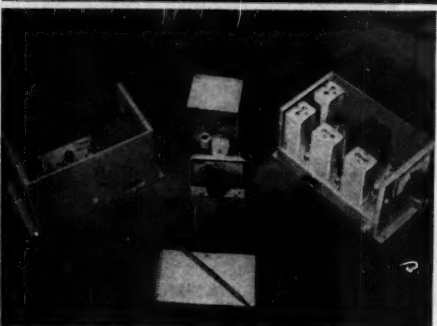
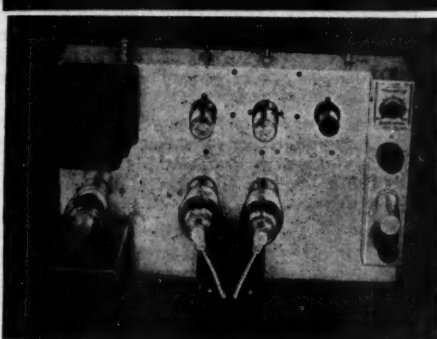
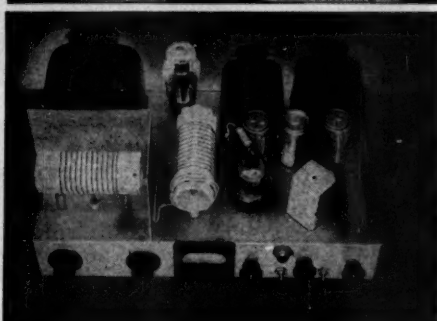
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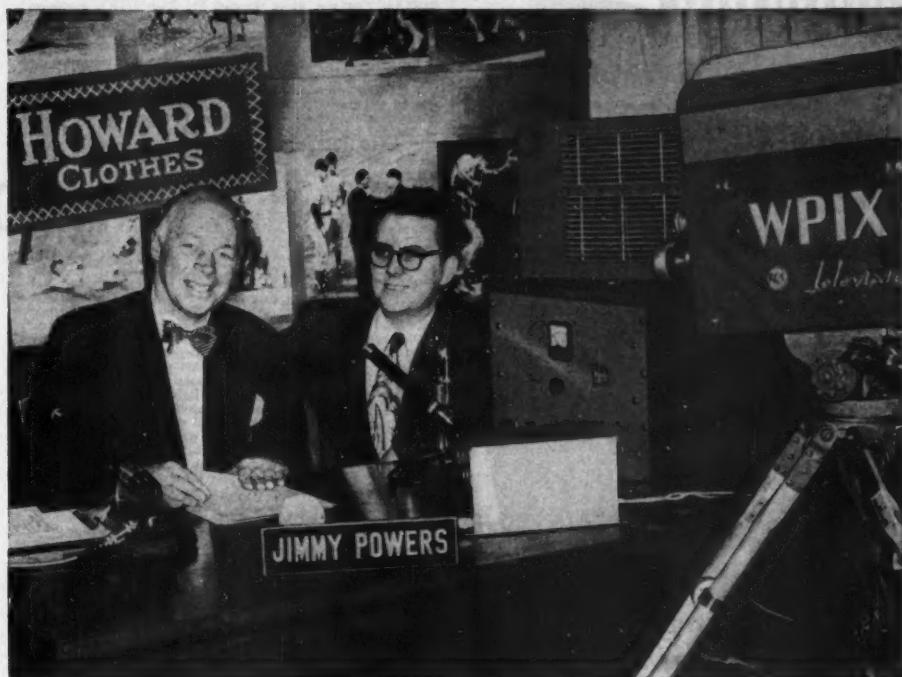
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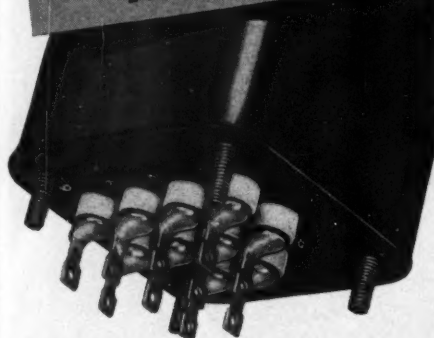
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(Continued from page 80)

in Worcester. QFB is rebuilding to get rid of TVI. A BPL certificate goes to THU this month. Traffic: W1THU 195, EOB 192, BVR 72, AZW 49, MOK 22, BDV 15, GVJ 12, AGM 11, RZG 11.

NEW HAMPSHIRE—SCM, Norman A. Chapman, W1JNC—SEC: KYG, RM: CRW. The NHN meets on 3685 kc., 7:00 p.m. Mon. through Fri. The NHEN meets on 3685 kc., 6:30 p.m., Fri., and on 3800 kc. 1:00 p.m. Sun. POK has been appointed an ORS. Ex-HJI sends his 73 to all his New Hampshire friends and will be active as 3KGI in the Philadelphia Area in the near future. It is my duty to report the death of W1BYC. In his early life Howard was a Navy submarine radio operator. His amateur interest was in working DX on 14-Mc. c.w. To his XYL we extend our sympathy. The TVI Ten-Meter Net meets each evening on 29,200 kc. with APK, AOQ, EAW, IJB, JNC, LCD, RIS, RMH, RSZ, RZD, and TDJ checking in. QHS made an FB report on the ARRL Frequency Measuring Test with only .0061 per cent average error. The University of New Hampshire Radio Club expects to have a station on the air. 6ZTS/1 is president. MCS has moved back to Patridge Lake for the summer. PVF will schedule anyone needing Stratford County for WNH on 3555 kc. Traffic: (Mar.) W1SAL 80, JNC 46, PFU 44, GMH 27, QJX 19, POK 15, MCS 10, JGI 8, RFP 2, (Feb.) W1CRW 184, (Jan.) W1CRW 412.

RHODE ISLAND—SCM, Roy B. Fuller, W1CJH—SEC: MIL, RM: BTY, PAM: BFB. The Rhode Island Net (RIN) meets Monday through Friday at 1900 on 3540 kc. The Naval Air Station Amateur Radio Club was formed with the following officers: KG6FX, pres.; KNE, ex-pres.; 6FCN, secy.; and 3OPG, trustee. The Club will meet every other Wednesday at 1950. The Newport County Club has made plans for Field Day. Like last year, operations will be around the tower in Miantonomi Park. The Club is sponsoring a code class at Rogers High School every Friday from 1:30 to 2:30 p.m. Fourteen students have availed themselves of this activity. The NAARO demonstrated amateur radio and its applications to the c.d. program at several gatherings in the town. A control station was set up at each meeting with mobile units of the NAARO covering all sections of the town with activity directed from the control set-up. New appointment: KNE as ORS. A new traffic outlet for Barrington is TGD. Traffic: W1BBN 230, QR 83, BTY 37, CPV 27, OIK 17, HRC 5.

VERMONT—SCM, Burtis W. Dean, W1NLO—RS succeeds RNA as EC for Essex and Orleans Counties. OAK is EC for Orange County. OAK, SPK, and TFB are new ORS. KJG is Asst. Communications Officer for CAP. TAN is Asst. EC for Rutland County. SET has Advance Class ticket. BRG is Jim Vele of Burlington. TLI is Fred Terrien of Essex Jct. EKU is building TV antennas. BJP completed all-band antenna tuner. ORO, PTB, PZX, and RNA are operating on MARS Phone Net. RNZ is active in CAP. NWW and QQN have Millen Grid Dips for chasing SWR. SCE visited NLO recently. NLO, with 80V as 2nd operator, hid in the 2nd Ten-Meter Treasure Hunt sponsored by the BARC. BRG was 1st to track down Old Man Dean, with QQN 2nd and TEW 3rd. Others taking part were OKH, QNM, RPB, TBG, and TLI. SEO is building 813 ftal. NLO recently visited AZV, FRS, and SDV. SDV reports the passing of BYC. Traffic: W1KRV 140, OAK 94, RNA 61, AVP 32, JLZ 22, IT 17, ELJ 11, BJP 8, TAN 8, QQN 6.

NORTHWESTERN DIVISION

ALASKA—SCM, Charles M. Gray, KL7IG—The Ju-neau emergency net has been calling up weekly on 28,570 kc. Thursday night at 7:00 PST. The rotating net control system is being used to give all stations practice in this operation. On one roll call a KH6 checked in on a QRZ. The Net operates for a radius of about fifteen miles with many mountains blocking line of sight, but all stations can maintain contact powers ranging from 400 watts down to 8 watts. GI, local EC, has contacted the city fathers for co-operation on c.d. CLX has left Sitka for the States and had one hold of the boat full of radio gear. W7OUR now is in Ketchikan using a 32-V transmitter. TM has gone on 'phone and is working on a super antenna for 3.8 Mc. How about some news from up north? Traffic: KL7TM 22, OBN 14, RU 13, ANI 9, IG 5.

IDAHO—SCM, Alan K. Ross, W7IWU—Hayden Lake FIS is new EC for Coeur d'Alene Area. An informal hamfest was held at EHZ's place as a pre-welcome to CDA for BAA, of Firth, who is moving up there. Those present were BAA, ILD, OTD, and FIS, also JZR and ALH from Spokane. Burley: EC HAH reports JBK as assistant. MJZ is getting his station ready for emergency work. VAC keeps home schedules from a suitcase rig while traveling for the CAA. DLA joined the club and is getting radio interest back again. JBK will be mobile soon. Heyburn: EC FT is trying to enlist his XYL, GNQ, into helping with the paper work. Boise: Both EC KJO and his assistant, OCR, have Band-meters for mobile now. IWU has a 3-30 Gonset into 160-meter Command receiver for all-band receiving mobile. The Gem State Club's new president is ORJ. Report your Field Day results to Headquarters to show Idaho participation. Traffic: W7NH 304, EMT 41, GHT 7, 18, FIS 12, IWU 8.

(Continued on page 85)

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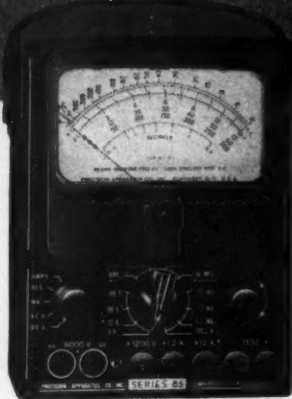


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MONTANA—SCM, Edward G. Brown, W7KGJ—CVQ reports the Northern Montana emergency net now is active on 160 meters. EGN is back on the air after many months of inactivity. PDE, a new call in Missoula, is working 7 Mc. LEQ is in the Army at Fort Ord, Calif. MKG is with the Navy on Guam. MJY, NEF and OGG expect to be called into the services soon. NRJ is working on a.s.b. FOM and NPV are mobile on 3.8 Mc. CJB, FOM, NCS, NDW, NPV, OGY, and OXT are mobile on 28 Mc. The Missoula 10-meter net frequency is 29.52 Mc. and hidden transmitter hunts are held nearly every Sunday. FKW is building 10-20 converter. CT lost his high-voltage filter the other day and sprayed his shack with hot wax. CBY is on with a.s.b. The Billings Club is planning bigger and better things. KUH and the telephone company have reached an agreement on their pole. (Walt is in the market for some used pipe). SAW has his vertical up at new QTH. OPM is constructing modulator. LBK is working 28 Mc. now. LCM is having trouble with electronic key and has FIN putting it back in order. Traffic: W7KGJ 153, CT 81, CVQ 53, KGF 24, BNU 9, BXL 9, EOI 8.

OREGON—SCM, J. E. Roden, W7MQ—OEN 'phone net now is on a new frequency, 3840 kc. SK, Glenn Dann of Winant, is a Silent Key. ESJ makes BPL. KL has been appointed by the c.d. director of Eugene and Lane Counties to be communications chairman for all of Lane County. FJD is new EC for Roseburg. AIZ reports that Barnes Hospital, in Vancouver, won the Chess Championship between the two Veterans Hospitals. Barnes at Vancouver and Marquim Hill in Portland, by winning all eight games, all games being played via the 144-Mc. channels. AIG reports his operations are confined to the 3.8-Mc. 'phone band and he welcomes any traffic for the Milton Area from the OEN. HDN is back in the OEN after an extended vacation. ESJ is anxious to get some of the Oregon boys lined up in the MARS Net since Reserve status is not required. JRU says c.d. planning at Klamath Falls is progressing rapidly. OZL reports that new officers of Burns Radio Club are IBD, pres.; OZL, secy. JIC soon will be on 14-Mc. 'phone. OZL and NQA are making AREC plans for c.d. AJN still is keeping Oregon Slow Net, OSN, on the ball. Hermiston Area soon may have a club. Some of the amateurs how located there are #BAY7, 70SD, CZ, IPH, AIP, HBO, La Grande, is assisting local Naval Reserve Electronics Company on meeting nights. Traffic: W7ESJ 392, AJN 267, BSY 194, KAB 193, OVO 182, KTG 172, MQ 167, IIV 63, GUR 50, OJA 49, TH 39, NOB 34, AXJ 21, HDN 18, BDN 17, NFU 12, NOJ 11, FY 10, NGG 9, ORX 9, AIG 7, BUS 7, ADX 6, KTF 6, OZL 5, JOG 4, GPO 3.

WASHINGTON—SCM, Laurence Sebring, W7CZY—SEC: KAA, RM: FIX. Make your plans early for the ARRL National Convention to be held in Seattle July 27, 28, and 29. On the program will be such items as a World Championship Code Contest, so you cannot afford to miss it! LBP and AWX have been working two-way on 144 Mc. from Everett to Yakima across the Cascades. The Bremerton 144-Mc. boys have been hearing Portland and Coulee Dam. LAG is out of the hospital and working again. He also is going to YMCA Technical School and has a new Lyngby 600 on. LYB has an 813 fired up with 250 watts. FBX works for CAA at KCJ receiver site. He reports BYK is in Japan with the Navy. EYS will be a KH6 soon, as he is moving to Hawaii permanently. Several members of the Tacoma Emergency Net have BC-603 receivers converted for a.m. The Vancouver Amateur Radio Club has taken a new lease on life and is installing a station at the Red Cross Building. KTL is returning to school. DRA is fixing up his shack and rebuilding, using an HK-254 with a VFO. New Official Experimental Stations are 8SQ, WDZ, and 3FSO/7. FRU is handling most of the RN7 traffic in this area and made BPL, along with KCU and IOQ. HKA checks into WSN quite often. The average attendance on the 1300 session of WSN has been 5, with average daily traffic 7. The average attendance for the 1900 session is 11.6, with an average of 11 messages being handled each night. HWK is running 450 watts and works in RN7 and PAN. KAB handles Oregon traffic on WSN. JZR has his noise back for the summer. EVW checks into TEN and MARS. KAA will graduate from college in June. FWD and FWR are busy in Garden. JJK is in the Army now. FIX built an electronic keyer. Traffic: W7IOQ 1594, CZY 1270, FRU 632, FIX 360, HWK 225, KCU 121, JZR 87, TH 65, FWD 55, DRA 51, LYB 46, ZU 23, NWP 19, LCS 6, KTL 5, CWN 3, EVW 2, JC 2.

PACIFIC DIVISION

HAWAII—SCM, John R. Sanders, KH6RU—The Kauai Club will have an exhibit at the local fair and is planning for Field Day. The Club so far has issued four of the KH Century Club certificates and urges those with 100 KH confirmations to apply for one. The Honolulu Mobile Club has formed three mobile nets, two in Honolulu and one on windward Oahu, to function under net control provided by the HARC fixed and portable stations, all part of the Disaster Relief master plan. The Hilo gang holds week-end portable and mobile equipment outings when the frequent rains permit. A Kaimuki High Student Group, under the direction of ZV, has applied for a club charter. ADY was one of many suffering gear damage in the storm.

(Continued on page 88)

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flood of March 25th. AFR is rebuilding. UA was transferred to Montana. AFQ is a new station working 28 Mc. AFS works 7-Mc. DX in the wee hours. RU plans to attend the Seattle National Convention. Traffic: KH6ADY 10.

NEVADA—SCM, Carroll W. Short, Jr., W7BVZ—SEC: JU, ECs: HJ, JLM, JYV, KIO, KOA, MBQ, NIV, TJY, VO, and ZT. RM: PST, OFS: JUO, Nevada State frequencies—3660, 7225, and 29,360 kc. AB 40 passed the Senate and was signed into law by Governor Russell so next year those who want call letters as license plates may have them. Thanks are due CTK, JU, OXX, and ZT for their help in getting this law passed. KIO received Certificate No. 7 for working 25 Nevada stations. KTH resigned as EC because of press of work at CAA. K7FAR is new in Las Vegas at Nellie Air Base. LGS has new rig on 7 Mc. JYA, UGA, LJK, LLS, and LKX are new AREC members in the Sparks Area. LXF has a 32V-3 and a 75A with a 4-KVA generator on a truck for emergencies. JLM has a new 200-watt rig and emergency power. PCH, ex-6ERA, is a new AREC member in Elko. JU burned out his mobile generator. NIV has 3 AREC members signed up in the Hawthorne Area. Meet your SCM mornings on 7225 kc. Traffic: W7BVZ 13, JU 6, JLM 4.

SANTA CLARA VALLEY—SCM, Roy I. Cousin, W6LZL—Civil defense is shaping up very well with very good progress in all parts of the section. UTV, our very capable SEC, has been recalled to the Marine Corps. We are very sorry to see him go as he has done an excellent job. TFZ has been appointed to carry on and has a fine record up San Mateo way where he was EC. San Jose held another simulated emergency and the mobiles were out in force and received very fine commendations from the City Manager. IXJ was in charge. CIS has a snappy net on 3501 kc. Mondays at 1900 PST. He also has 144-Mc. mobile now. MMG reports 144-Mc. emergency frequency for San Mateo County has been changed to 146.88 Mc. Drills are held Friday nights from 2000 to 2100 PST. MXO, from Los Angeles, now is active on 7-Mc. c.w. with 807 rig from Anita Park. RKG has a new jr. operator. IUY has new quarter-wave vertical on 7 Mc. CAZ is working hard on 144-Mc. project; he also is operating on Palo Alto Net. HC had an antenna-raising party, 3.5 Mc. and TV. YHM is running 65 watts on 3.5-Mc. phone using modified TCS rig. SCCARA has another tri-section hamfest planned to be held at the Weiland Brewery July 7th. A wonderful time and very fine prizes are offered. In addition to the bar-b-que dinner, July 1st is the closing date for the preregistration prize. The Palo Alto Club is planning a bar-b-que get-together and Field Day combination this year at which a bang-up time is guaranteed. Traffic: W6HC 272, BPT 153, YHM 44, MMG 4.

EAST BAY—SCM, Horace R. Greer, W6TI—Asst. SCM, Charles P. Henry, 6EJA. SEC: OBJ. ECs: ZET, EHS, NNS, IT, IDY, LMZ, QJW, WJN. YDI is plugging along. NGC is back on the air with a 32V-2. He has received A-1 Operator certificate. QXN has a little more time now for traffic. New officers of the Richmond Radio Club are EJA, pres.; ELJ, vice-pres.; FDV, secy.; QDE, treas.; HYE, agt. at arms; QUL, NJX, HFM, and FSB, directors. EJA has a new long wire up. LMZ is knocking 'em over. QDE is building a new final. DTW has left Richmond. The Richmond Radio Club meets in the Red Cross Building the first and third Fridays of each month. On April 5th the Oakland Radio Club held an oldtimers night and a good crowd of the old guard turned out for a bean dinner and ragchew. The Oakland Radio Club meets in the Red Cross Building the first and third Thursdays of each month. JZ again makes BPL with a nice traffic total. JVE has a two-tube battery-powered station working, using a 6V6 and 6SN7 for 3.5-Mc. portable mobile. 70HX/6 is waiting for his W6 call. FB has almost finished with new finals for each band. Bill Doctormann, 9FNG, is a patient at the Kabat-Kaiser Hospital, Vallejo, and members of the NBARA are helping him get on the air. The Mission Trail Net gang is considering a change in QTH for its big round-up. In past years this big get-together has been held in Coyote, but this year the Nevada gang has come up with Lake Tahoe as a suggested meeting place and has caused some interest among the MTN gang. MEK is enjoying new QTH and using low power with a 7- and 14-Mc. ground plane antenna for the time being. GIZ is making plans in his new QTH for an antenna farm. DUB is planning big things. MVQ did an outstanding job considering bad conditions in the recent ARRL DX Contest, winning the c.w. event for the Northern California DX Club. ITH has been very QRL since the Korea event. ELV seems to be a silent man these days. DYP seems to be enjoying his new antennae. TT is knocking a few over but is pretty JRL work. OBJ is looking for someone to replace him as SEC because of his health. Anyone interested, please contact OBJ or TI. This section could use a good PAM. Anyone interested? Traffic: W6JZ 1871, QXN 248, NGC 20, YDI 18, TI 3.

SAN FRANCISCO—SCM, R. F. Cseikowitz, W6ATO—Phone: JU 7-5561. SEC: NL. Phone: PL 5-6457. Eureka Area: EC: SLX. GDV is back in Naval service. JSD/6 works for radio station KHUM. KL7KE now lives in Arcata. SLX is back on the air with 28-Mc. phone, as are CWR and JSY. 7CZU was a recent visitor to the HARC from the SS Santa Adela. FKI and GOR also visited from Mt. Shasta. EQQ is busy with c.w., and FYY with DX only. Mobile
(Continued on page 60)

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The windings are put on with a toroidal winding machine to insure uniformity of smoothness, tension and 'lay.' They are banked around the inside of the core, and single layer on the outside.

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Terminal plates are equipped with moulded barriers to prevent any whiskers from connecting wires short-circuiting terminals. Both solder- and screw-type terminals are provided.

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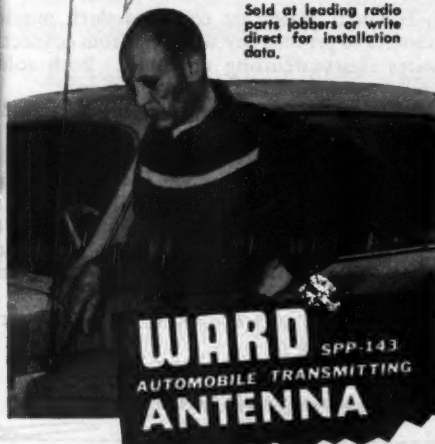
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work has become the main attraction for BME, BWV, and WYP, with a little DX thrown in for BWV. The call KTV has been issued to the secretary of the HARC. YUH is running an 820 on 144 Mc., while HBI is working 28 Mc. a lot. WYP lost his filter choke. IRJ has been called back to Naval service. FCR is a new member of the Club. LE, DQA, ZZK, BBN, QCS, ZSE, and KAR are heard occasionally. Many thanks to Julio Sannasari for his welcome news from the Eureka Area. The HARC meets the second and fourth Fridays in the YMCA Rooms, rear of Municipal Auditorium, entrance on "E" St., Eureka. **San Francisco Area:** EC: BYS. Asst. EC: JWF. CTH now is located in Redwood City. Major Art Monsees, HJP, will be at Everett, Wash., with the USAF. Communication plans of the Disaster Council are becoming concrete, and also plans for amateur communications for the Warden Service. All amateurs are reminded that joining the Emergency Corp is one of the ways that prove to the general public and to the Government that amateur radio is in the public interest. The San Francisco Radio Club meets the fourth Friday at 1041 Taraval St., and the High Frequency Amateur Mobile Society meets the second Friday at the local Red Cross Building, 1625 Van Ness Ave. **Guam - Japan:** Emergency April 1st, all the Pacific Islands come under the Hawaii section in order to make, geographically, a more closely united section. KG6DI now has been detached from Guam and is in the destroyer service. KG6AAD is active but handles most of his traffic from KG6FAA. JA3AC again reports in with a heavy traffic total. KG6FAA reports he has received some new equipment; also that there is considerable activity on NCARS frequency. KG6AAD is active. **Marin County Area:** EC: KNZ. Emergency, and especially mobile work, continues to hold the spotlight in Marin County. The Marin Radio Amateurs Club meets the second Friday in the Engineering Lecture Room, Marin College, Kentfield. The Tamalpais Radio Club meets the third Friday at 232 Mirimar Ave., San Rafael. **San Joaquin Area:** EC: IEN. Congratulations to the newly-elected officers of the Sonoma County Radio Amateur Club. They are LCZ, pres.; EBI, vice-pres.; and ZKM, secy-treas. DTV has his 38-foot steel tower up, complete with ten-element 144-Mc. beam. KIW, WDM, and LGQ are getting their 144-Mc. gear ready in Petaluma. BAZ is building a triple conversion receiver for 144 Mc. FWD is moving to Hemet, in Southern California. The Sonoma County Radio Amateurs Club meets the first Wednesday in the Tap Room of the Grace Inn, Eureka, on Second St., west of the Freeway. **Santa Rosa:** Traffic: KG6FAA 2048, JA3AC 1935, W6SWP 203, KR6FG 107, KG6AAD 91, W6JCG 19, BIP 18, ATO 7, HQN 3.

SACRAMENTO VALLEY—Acting SCM, Willie van de Kamp, W6CKV—Asst. SCMs: Northern Area, 6YNM; Central Area, 6CKV; Southern Area, 6ZIV, SEB, KME, ECs: Met. Sacramento, AUO; Walnut Grove, AYJ; Dunsmuir, JDN; Mt. Shasta City, EWG; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OBS, AF, BTY, PAM: ZYV. OES: PIV, GHE. OO: ZYV, YNM, BTY, GDO, YV. OPS: JDN. Nets: Sac. Emergency (city) AUO NCS. Sac. Valley Net, JEQ NCS. Mother Lode, UNT NCS. Tall Pine, YNM NCS. **Northern Area:** JUV puts Lewiston on the map. **Central Area:** VQJ has gone to Sacramento. KTB is a new ham in Challenge and KKD is new in Folsom. **KRX** conducts code classes nightly on 28.2 Mc. from 2015 to 2030. The Chico gang is having good results with mobile on 1920 for emergency work. K6NAK is on with emergency power. **Southern Area:** MYT is active again. HTS is bringing up code speed to handle traffic. GDE was inducted into the Army. BTY, ILZ, JEQ, PIV, and ZYV are mobile with combination 10/2 transmitters. WLI transferred to the Bay Area. WSI is rebuilding. ASE now is 28-Mc. mobile. SUP is building 14-Mc. beam. The Placer Radio Club has 350-watt all-band emergency rig. KVP moved to Grass Valley. DJG is with Uncle Sam by request. ENW is busy at the University in Seattle. ZFD is in the TV business. NBW is working at McClellan Field. WFW is building 350-watt final. Traffic: W6PIV 129, JEQ 72, JDN 62, KRX 59, MYT 46, ISO 44, HNL 39, ZYV 20, GDO 9, KTS 8.

SAN JOAQUIN VALLEY—SCM, E. Howard Hale, W6FYM—SJV c.w. net on 3525 kc. still is going strong and activity is growing, according to RM and Net Director GJP. Net certificates have been issued to EXH, LRQ, QUE, and K6AU for regularly checking in for the past three months. The Turlock Club has a new clubhouse donated rent-free, courtesy of DVS. New Turlock Emergency net on 144 Mc. has ten stations checking in with EC W6FIP as Net Manager. EHN, EC for Bakersfield Area, has done an excellent job in lining up AREC members in his area. RJE, of Bakersfield, has been appointed an Official Experimental Station. LRQ is building a.s.c. filter exciter and hopes it won't make him sound like Donald Duck. The Fresno gang has been active promoting and advertising the April 28th Fresno Hamfest. Their official bulletin, 38p, has been mailed to most of you so there is no need to repeat the news here in this column. VSJ has sold out his station complete. GWQ is president of the new Modesto Club. FCH is a new station in Ripon. P8Q has moved from Fresno to Monterey so has cancelled his OES appointment. BCL wants to know who wants to get on 420 Mc. in the northern end of the section. Don't forget to send me reports, gang; it is section 144 duty to write a column without them. **SJV Net March traffic**

(Continued on page 94)

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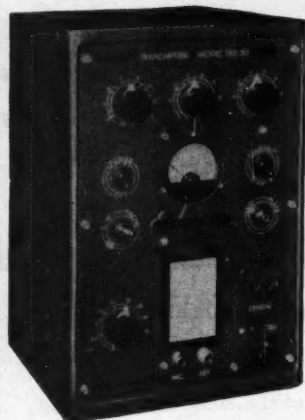
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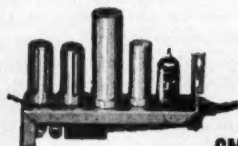
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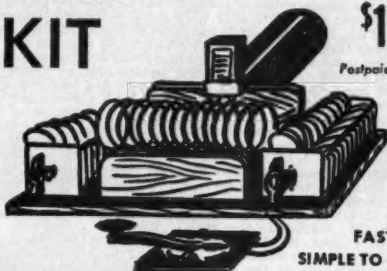
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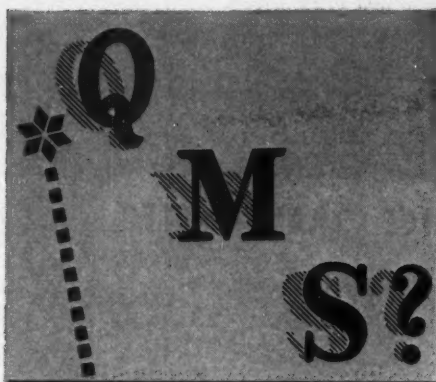
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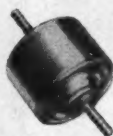
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CRYSTALS

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(Continued from page 80)
total was 88. Traffic: W6GJP 64, LRQ 64, EXH 21, QUE 10, JQB 15, PGP 15, K6AU 14, FYM 7, 7OHX/6 5, W6GYH 4, ELQ 1.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Herman P. Jolits, W4DCQ—SEC: ZG. PAM: DLX. RM: AKC. RGH reports traffic and his net schedules by way of NZG. NZG also reports his operation for the month and gives information on his new p.p. 813 c.w. kilowatt now under construction. JPY held emergency drill for E. City using both low-power mobile and fixed stations. Some of the stations participating were JBD, LCV, RUX, NRN, NBR, and MX. NAL carries on very well during the absence of DGU on Tarheel Phone Net meetings. RM AKC reports good activity on N.C. c.w. net. DCQ and NYN were active during the 'phone section of the DX Contest and report 3.8-Mc. DX with FF8, MD2, M13, CN8, and Z80, all on phone. DGU, PZE, NYN, and DCQ had a round table with a tarheel away from home, CN8EJ on 3.8 Mc. PZE now has his new Viking transmitter on the air on 14 and 28 Mc. and is using his half-kw. on 3.8 Mc. CYB reports that his latest project has been the construction of two 50-Mc. transmitters for the Charlotte c.d. frequencies. DLX, DCQ, and CVQ say that nothing has happened on 50 or 144 Mc. in so long that even good heavy line noise on these bands makes them sit up and take notice. OQQ is going into the hospital for a check-up. CVQ and HUW have been having water troubles; Jake can't get his well dug and Max's has dried up. Jake is moving to his new QTH in Raleigh to Hams Paradise. Traffic: KAWS 118, W4REZ 80, DLX 34, FRH 24, DCQ 12, HUW 9, CVQ 4, DGU 4, SNQ 4, CYB 2, GOB 1.

SOUTH CAROLINA—SCM, Wade H. Holland, W4AZT. Asst. SCM, Benjamin L. Team, 4DX. SEC, ANK. We wish to welcome QCC/4 to North Augusta and congratulate him on the new jr. operator. ANK makes BPL again this month. DFN has come to life again on 3.8 Mc. IW has 400 watts on 7 Mc. now. FFH, ANK, and GWH/4 are quite active from Charleston on 3.8 Mc. New officers of the Charleston Amateur Radio Club are KOD, pres.; ANK, vice-pres.; CXE, secy.; and OWW, treas. The Charleston Club will give a demonstration of amateur radio to South Carolina civil defense officials during April. The Club has three mobiles on 3.8 Mc., three on 28 Mc., and one on 7 Mc., plus portable control stations on each band. 6YQS/4-mobile and 2GBE/4 are new to Charleston. Wonder what has become of BPD? The Voice of America broadcast of the Greenville Club resulted in several SWL letters from Europe and the Far East. As a result of the broadcast GZO had a letter from a friend in the Pacific whom he had not heard from in fifteen years. Several of the hams over the State are participating in the CAP radio network in South Carolina. Nothing has been heard from the Columbia hams in quite a while. Traffic: W4ANC 415, QCC/4 133, AZT 30, FFH 22.

VIRGINIA—SCM, H. Edgar Lindauer, W4FF—Attendance and perseverance in the Virginia slow-speed net has been prominently displayed by RYS, PWX, IYL, LCL, KFC, NV, KDL, QDX, PDY, KSW, JHK, BCI, LAP, RKM, LPP, KAWAI, K4WIL, W4PEQ, SDK, JTG, PNE SOA, 8DZD, 3UF, K1BG, W3QZC, 3FNC, and 3HJV. NBA, PXA, K4AIR, W4FV, MUP, and MWH were issued VSN net certificates for attendance. New officers of the Potomac Valley Radio Club are KFT, pres.; JUTC, vice-pres. and sec. mgr.; 3AEL, rec. and corr. secy.; 4PNK, treas. CVO and JCC attended the IRE show in N.Y.C. with CVO working aero-mobile en route. SIY is sporting a new 32V-2. SGE is a new Bluefield station. KFC had a visit from 90LU and 6QD. 8VAN, ex-381W, has returned to Danville as 4VAN. CLD is operating portable from summer cottage. FF's 70-ft. mast has been reerected after suffering ill effects from the last burst of winter. NAD enjoys the thrill of 20-watt DX on 7 Mc. JUY now is pushing 400 watts of phone on all bands except 7 Mc. New ECs are EYJ, Richmond, and IJO, South Norfolk Area. MAD is communication officer for Roanoke County and acted as NCS for Louisiana and Mississippi Emergency Net. VFN attendance certificates were issued to AKN, KPE, DCW, LTZ, PDY, LBT, and IJX. EC appointments were renewed for AJA, AKN, JFV, BCI, AY, BIG, LBB, MLE, FV, IBE, NBA, NKV, CFV, CSC, IYL, JAR, KDL, KRX, and KWT. Area emergency meetings were conducted by IBDI, FF, who still is hitting the road for the Dept. of Defense, is being outdone in attendance records and traffic-handling by FV. K4AIR received a letter of commendation from the American Red Cross. Born with 20 members during the month at Charlottesville, one University of Virginia Radio Club, 8K1, 225-watt phone and c.w. with emergency power available. Officers are NCN, pres.; NHX, vice-pres.; NKV, treas.; W. Grainger, secy.; Dr. Huntington W. Curtis, trustee. Traffic: K4AIR 509, W4MWH 390, LAP 190, FV 164, QDX 111, PWX 91, RYS 58, MAD 56, JAQ 54, IA 44, NAD 33, KFC 32, CVO 20, JHK 20, LK 19, FF 18, MUP 12, IYL 11, KSW 10, CLD 8, GB 4.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—At a combined meeting of the three radio clubs in the Charleston Area, JF, E. Handy, IBDI, of Headquarters, (Continued on page 80)

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spoke on civil defense and League affairs. The Tri-City Amateur Radio Club has applied for affiliation with ARRL. Officers are LIL, pres.; YKX, vice-pres.; and DHX, secy-treas. UYR plans to feed his 14-Mc. beam with 200 feet of coax. The Appalachian Radio Club of Beckley sponsored a W. Va. hamfest with a swell turnout. Division Director CVQ was the main speaker. The 7th West Va. QSO Party was a huge success and winners will be announced next month. FMU visited the Stonewall Jackson Club at Weston and the radio club at Beckley in the interest of emergency planning. Assistant Directors met with the Division Director at Beckley on April 15th. 3LXE (ex-8CNZ), 3JIW (ex-8RDC), and 4KTA (ex-8QBB) were quite active renewing friends in the W. Va. QSO Party. AUJ has been appointed civil defense director for Lewis County. The MARRA entered a complete station in the Fairmont Hobby Show and received good publicity. W8L's talking bird now calls CQ for Denny. ELX has moved up to 3.5 Mc. after operating on 7 Mc. Traffic: W8AUJ 633, BTW 72, DFC 26, ELX 14, DZX 13, BWK 10, YPR 9.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, M. W. Mitchell, W8IQZ—SEC KHQ. Asst. SEC: PGX, RMs: ZJO and LZY. ECs: KHQ, ENV, GQY, ACM, AGU, MHR, MOM, OTG, HJX, PGX, PQZ, PNK, PXZ, GDC, VSM, and YMP. ZJO took time out for RCC but still handled 1700 messages. AGU had three valid tickets at one time, Class A, B, and C. LZY reports the Colorado Siding gang is setting all set for civil defense. DYS changed from coax feed to twin lead and gets out much better. CMO reports the Colorado C.W. Emergency Net is coming along fine but more are needed in it. GDC reports the Western slope gang is getting emergency gear set up on 160 and 10 meters. YMP is using a Collins 32V-2. The response shown by the hams in Colorado has been quite disappointing in regard to civil defense program. We need an EC in every town in Colorado. At present only 15 per cent of the communities in Colorado have ECs. Send in your application NOW to your SEC, or to me. It isn't even necessary that you check in on a net, just so we can depend on YOU in YOUR community! Yours truly is seriously considering doing away with the Colorado section news except for traffic handled and civil defense news and information. Your comments will be greatly appreciated. At the present time we need ECs in Sterling, Craig, Alamosa, Durango, and others. Traffic: W6ZJO 1700, IA 46, MOM 46, KHQ 20, GQY 28, LZY 26, PGX 15, DYS 13, CMO 12, GDC 4.

UTAH—SCM, Leonard F. Zimmerman, W7SP—The UARC 10-meter mobile net, with ZDX as NCS, has been very busy training. The fellows have completed the Red Cross first-aid course and are studying the use of fire arms now as they have been appointed special policemen. There are about twenty active members now and they meet Mondays and Wednesdays for drill and study and an occasional transmitter hunt to liven things up. The Ogden Radio Club is getting a similar organization started for Weber County. RUX and the ten-meter ground-wave net are doing a good job of covering the State on 85 Mc. but still need members in some outlying districts. MOY has moved to Salt Lake City and is being heard on 28 Mc. UTB is going to higher power so he can be heard over the State under all conditions. Traffic: W7KUX 38, SP 10, UIB 3. **WYOMING**—SCM, A. D. Gaddis, W7HNI—HPE is the 6th Wyoming station. A. D. Gaddis is set up with transmitter in the bedroom. MWS improved 3.5-Mc. antenna. MBL is on 28 Mc. with new transmitter. KMF is active at Riverton. TJ is DXing on 14-Mc. c.w. MFL is back in Gillette. JGS and GOH are using their mobile rigs. 8ZAI kept busy during the test on 144 Mc. MNA, MVK, OWZ, DI, JRG, and HNI are working 144 Mc. with good results. The Sheridan Club is working on an emergency station. The Shy-Wy Club is starting its eleventh year. FB, gang Traffic: W7ZAI/7 24, W7NVX 6, GS 2, GSQ 2, HNI 2, EVH 1, MWS 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Lewis C. Garrett, W4LEN—Ap- pointments: OFS, LHM and HFP. OBS: OAO. By this time the Tri-State Hamfest, 1946, is history, but has left pleasant memories. Our congrats for an FB job, boys. AUP attended Rock Springs, Fla., Hamfest. PHR, active OO, is moving to a newly-purchased house in Anniston. 8ACK/4 is going 3.8-Mc. mobile from Selma. BMM is forming a c.d. and emergency net in the Cullman Area. FZN is moving back to Fairhope to give ISB a sailing lesson. INZ has a new XYL. HKZ is active again on 144 Mc. SANK/4 is active from Mobile. LWO is erecting new all-band aircore. CYL is building new exciter for kw. final. MEM is rebuilding from line cord to final link. JKU is preparing for Class A exam. RUG is grinding crystal for AENB. New calls for AENB: ALG, JKU, IKM, and EJZ. Tuscaloosa now has six of the gang on 144 Mc. LCK, an FB SEC, has moved to Chattanooga with the CAA. The Mobile Club gave Carl a farewell party at ISB's QTH. He leaves with the best wishes of the Alabama gang. Any interest in Alabama QSO Parties? Two hours—Sunday afternoon once a month—phone, c.w., and cross-band. Traffic: (Continued on page 98)

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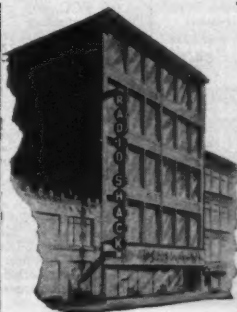
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126X—Heavy Duty—straight spring, swivel base.....	9.40
132X—Double Tapered—spring swivel base.....	8.75
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100-86S.....	5.15	86"	106-86S.....	4.35
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EASTERN FLORIDA—SCM, John W. Hollister, W4FWZ—The Rock Springs Hamfest, sponsored by the Orlando Radio Club, was terrific. Daytona Beach: RWM did a nice job with emergency call for AUP via BQU and Highway Patrol. New Class As are FYA, FYB, and QAG. FYB is running 75 watts with controlled-carrier on several bands while QAG runs 100-watt controlled-carrier on 28 Mc. Jacksonville: JARS had an excellent program on CDC. BT was a welcome visitor on the way to Louisville. RTJ is mobile on 3.8 and 28 Mc., plus 2 1/4-kw. generator at home. MNG has the big rig installed for CDC. CGG reports the "river gang" is very active on 28 Mc. Green Cove Springs: PJW and QCU are working hard for Class A. FYF is on 28 Mc. with a 100-watt 3N1H/4 is on 7 Mc. Key West: Work five members of the Conch Net and get a hand-painted coconut souvenir! To get that souvenir, here are some calls: BCZ, EFB, EJD, IWM, JHL, MCX, 5NPA/4, NQU, OLA, OPZ, OVK, PHE, PUW, PWU, QBH, 3QYJ/4, RBC, RIE, RTS, RZZ, SKK, 5KZA/4, EEJ, KOH, and RSX. Lakeland: We wish BOD a speedy recovery from a heart attack. Miami: Our old friend IP now is a PF4. SKK is another teen-ager in Miami, as is SAT. SKC is out for traffic on DX. Orlando: OZC got the Gator Net (7290 kc.) off to a flying start. 2BZU had a great visit down here and a get-together with AKV, AWS, DUA, DQA, DWI, GTM, KIN, NXA, OZC, PIK, PMN, QIN, OCG, and ex-3JIC. Palatka: Ye SCM is the recipient of a nice Screwball Net certificate. Work five of the Gem City gang and get one. Look for these: Aasels City Screwballs PF, OBB, QCU, QAS, and QCP and get more information. OCG made BPL. Traffic: W4OCG 434, LMT 127, OGI 91, PUJ 60, PZT 59, KJ 57, WB 36, DES 30, FWZ 17, NAK 10, RWM 10, SKC 5, CKB 2, SAS 1.

WESTERN FLORIDA—Acting SCM, Edward J. Collins, W4MS—PQW is looking for reliable emergency units. MMA is interested in 50 Mc. JPD is going out FB on 28 Mc. PPK has mobile gear underway. QJ has been on again. VR still keeps 7 Mc. hot. CQF has a nice beam. SAW has a gallon going FB. RCH has gone to school in Tennessee. NQY is on Knights of Kilocytes. The following stations are heard on 28-Mc. ground wave: RIH, PJT, QCB, IRO, GZB, GTJ, REK, SGG, KYJ, and MMA. MS worked HC20T on 50 Mc. BFD and FHQ are interested in the ultra-highs. HIZ and CNK keep schedule on 144 Mc. PLA does an FB job on the emergency net. PRV now has break-in. LRC has been recalled to active duty in the Navy. MFV keeps 3.8 Mc. going. TL had an FB time in the SS. NOX still sticks to 14-Mc. c.w. DAO now is a grandpa. HJA wants a high-power final. OCX is away with the National Guard. EQZ and NJB work 3.8 Mc. exclusively. NN and AGB seem to operate 3.8 Mc. only. AXP is our traffic man. 144 Mc. in Western Florida is horizontally polarized.

GEORGIA—SCM, James P. Born, Jr., W4ZD—The Atlanta Radio Club's Annual Hamfest will be held June 10th at Robinson's Tropical Gardens on Paces Ferry Road on the banks of the Chattahoochee River. A Collins 32V-2 will be given to some lucky attendant. New appointments are: ECs: RGC for Baldwin County, OSE for Hall County, FHW for Cobb County, ORS: MTS, OES: MZO, OES: FBH, OPS: FBH, MZO, BOC, and OPS. The following certificates have been endorsed: ECs: HBE, AAY, HYN, IRL, OBS: LXE, ORS: HYW, DXI, FKE, AAY, KSZ, KGP, OPS: DXI, OO: DXI and FKE. Congratulations to K4WAR with a traffic total of 1053. HJR has moved to Augusta. RNK has a new 28-Mc. mobile rig. OIL is now president of the Albany Amateur Radio Club. PUY operated overseas under the calls F7AA, CNSEB, EK1TD, and VF4TT, and now is in school at Vanderbilt U. QAC has moved to Oklahoma. NWK is the new treasurer of the Atlanta Radio Club. OPS and SLH worked MM off the coast of Florida for a week. DBZ moved to Conley from Lake Jackson. ADN, ex-SADN, has moved back to Atlanta from Mississippi. KWC and BOC now have their DXCC certificates. LXE has a new mobile rig on 3.8-Mc. phone. Mr. W. D. Johnson, Engineer in Charge of the Atlanta office of the FCC, was guest speaker at the Atlanta Radio Club's April meeting. Traffic: K4WAR 1053, W4KOR 31, ZD 30, MTS 21, FBH 20, BOC 18, HDC 11, KWC 9, IRL 1.

WEST INDIES—SCM, William Wenzel, KP4DJ—SEC: ES, CI, CG, DV, and ES are 3.8-Mc. mobile. JA, FJ, and CK are installing 3.8-Mc. mobiles. Seventy-one CAP cadets at Ponce are studying for novice tickets to operate CAP fixed and mobile units. FJ has been reappointed EC for Ponce district. KV4AO renewed ORS appointment. OW obtained his ticket and joined AREC. DJ resigned Super-Pro and now is working 3.5-Mc. DX. The PRARC elected CL, pres.; CB, vice-pres.; KD, secy.; BV, treas.; CY, DJ, GP, IS, and JA, directors. UW is building VFO and multiplier. KD and HU are experimenting on 440 Mc. W4IFP now is with the P.A. at San Juan. The MRAC held a picnic/field day at Lequillo Beach March 18th. GO is attending radio school at Ft. Monmouth. DU wants more QSOs on 160. HM received Class A license and joined 3.8-Mc. AREC net. DV has new all-band mobile. ID's 3.5-kw. generator is being overhauled by OW. Please report traffic handled. The 3925-kc. emergency frequency is gaining in popularity, in-

(Continued on page 100)

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cluding mobile operation with island-wide contacts. C.d. radio activity is at a standstill. Traffic: KP4DJ 4.

CANAL ZONE—SCM, Everett R. Kimmel, KZ5AW — The 24-hour dry run emergency-powered Field Day put on by NM and ALT and the Crossroads Club gang chalked up 122 contacts on seven bands, including fifteen on 3.8-Mc. phone. Enough members of the Army, AF, and USNR participated to make it a highly satisfactory demonstration of a joint ANAF disaster control drill. AC, AK, AW, BL, BT, BY, CG, EP, FL, FJ, HA, JQ, MD, MN, PC, RM, WA, and WJ received their MARS certificates at a ceremony in the Signal Office USARCARIB followed by a luncheon at the Clayton Officers' Club. WA moved to GM's old hilltop QTH. BL puts in plenty of hours with OBS and code practice runs. TB and/or his code and theory classes at Albright AFB are attracting plenty of future YL operators. 3.8-Mc. phone is looking up. JB worked the States in the early evening and worked transisthman with NM. RM and PC have just hung up 3.5-Mc. folded dipoles. PAM PC now is Asst. EC for mobiles. The CG-K4AIR circuit could use a little traffic. Traffic: KZ5FL 61, AW 8.

SOUTHWESTERN DIVISION

LOS ANGELES—Acting SCM, Vincent J. Haggerty, L W6IOX — This probably will be my last report as Acting SCM. Reports were heavy this month. Thanks to all of you for your cooperation. Keep the reports coming in so that the incoming SCM will have something with which to work. KYV topped the section in traffic with his four very active transcode schedules feeding traffic to mainline stations. GYH was runner-up in traffic by virtue of numerous schedules. Oldtimer UHY returned to big league traffic in style with schedules with 4PL, 2BO, 5BR8, and 6KYV. CKO and JQB reported via radio. DTY is working on a big rig and expresses need for more stations on 8CN in the Los Angeles Area. SD/6, manned by members of four clubs with CMN as chief operator, handled the Los Angeles Los Angeles Hobby Show. BHG continues his fine code practice and official bulletins. ANT reported from the Mission Trail Net and says he has been recalled to duty by the USAF. 70HX/6 is on 7 Mc. at Morro Bay. YSK is back at work and will increase his ham gear budget. COZ reports: IGE, SW, and CMR went mobile radio on a vacation trip; EJQ and HYE got Class A tickets; JMY and IGE are going into USAF soon; GJN visited 9FNG on vacation; YMY is on 160 meters; COZ has 28-Mc. converter trouble. Thanks for the information. Gene. GTE sent in OO report and has acquired an oscilloscope. MVK reports that he is moving to new home in Claremont and resigning as PAM and that new officers of the Two Motors and Down Club are IHK, pres.; DQO, vice-pres.; MJ, secy.; Horace Bodine, treas.; MVK, rathe. C88 is new EC for AREC station at Red Cross headquarters, Los Angeles, with HBY, JM, DQO, ISY, and MVK as assistants. HZ won v.h.f. activity award for Los Angeles section; IHK/6 won v.h.f. expedition award with 300-mile contact; BYE won v.h.f. marathon with 8070-mile total. ZL and UHF have new thirty-element beams for 144 Mc.; HZ uses six stages coaxial r.f. stages ahead of his receiver on 144 Mc. working on putting the r.f. stage in the antenna itself. ANN has high-power job on 144 Mc. Thanks for the dope, Tom. BUK says his rig works FB on 3.8 Mc. ON is on the Naval Reserve Net on Thursdays. He is making extensive changes in his shack. BES had his ORS ticket endorsed. He says he has new antennas all over the place which are netting him some choice DX. Traffic: W6KYV 2020, GYH 1362, UHY 1000, JQB 380, LDR 333, DTY 257, DBY 241, CKO 136, HYL 126, SD/6 105, BHG 66, HLL 60, FYW 41, TDO 39, ANT 37, W7OHX/6 24, W6FMG 12, COZ 8, YSK 8, GTE 2.

ARIZONA—SCM, Jim Kennedy, W7MID — New ORS appointees in Tucson are OYJ and JGZ. Our congratulations go to BH, of Mesa, on his traffic total for the month. Pop drove 150 miles to deliver one message to Tonopah! OWL and MNU are both QRL with school. Bill's antenna blew down in the big wind. UKK checks into the daytime net on 7200 kc., and got some nice publicity in the local paper. NDJ decided to rebuild after the cat got trapped in the rig, fatally. K7NRZ shows plenty of activity as NCS of the daytime net, with schedules all over the Southwest. FGG is mobile on 50 Mc. in Tucson, and LVR and HUV are fixed on that band. NYK is mobile on 3.8 Mc. Two new calls in Tucson are PEF and PEG. Congratulations, fellows. The Arizona gang enjoyed a nice outing at Coolidge. Let's have lots of activity by clubs and individuals on Field Day. Our best wishes to everyone in the fray. Traffic: W7BH 565, OYJ 274, K7NRZ 204, W7MID 33, LQB 32, LVR 20.

SAN DIEGO—SCM, Mrs. Ellen White, W6YWM — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Hudston, 6DLN; Thomas H. Wells, 6EWU. SEC: NBJ. RM: ELQ. ECs: DEY, VJQ. DEY reports that emergency mobile and power equipment operation and construction is up 99 per cent in Orange County, and he expects to have about thirty mobile rigs in operation in the County shortly. The SD YLRL sponsored a white elephant sale and card party in March to raise funds for the AREC.

(Continued on page 108)

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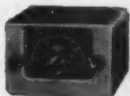
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140X Above with Heavy Duty Spring	7.65
142 Bumper Mount, no spring.....	3.35
92 15" Adjust. Extension Bar.....	3.35
Antennas, stainless steel	
100-965 96" whip, 1/4" stud for	
all mounts.....	\$5.25
106-965 96" whip, plain end to fit	
92 ext.....	4.50
All-Band Antenna, 20, 40 or 75	
meter coil.....	8.75
Extra Coil for 20, 40 or 75	
meters, 60.....	3.30
Note: use all band antenna on 10 by shorting coil.	

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25 watts minimum peak power. Clamp type modulation. Tuning adjustment from front panel. Dimensions 4" wide, 4 1/2" high, 6" deep. Rounded drawn case, black wrinkle finish. Tubes: Model A 3-6AQ5... Model B 3-6V6GT... Model C 3-12A6. 25 watts power minimum. Amateurs: 10 meters, 20 meters, 75 meters. Civil Air Patrol: 2374 kc.....\$29.95 Net less tubes
Model 144 2-Meter Receiver.....\$49.95 with tubes
Model 381 Mobile VFO High Impedance \$26.95 with 3 tubes
Model 381 Mobile VFO Low Impedance \$33.95 with 3 tubes



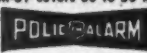
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Model PR-8 for 152 to 162 mc band... \$44.95, complete with 14" whip indoor antenna.

NOTE: In view of the rapidly changing price situation in both complete units and components we wish to emphasize that all prices are subject to change without notice, and are Net, F.O.B., N.Y.C.

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It is with deep regret that we inform our readers that Leo Carroll, W6LOL, has passed away. Leo was an active ham, well liked by all who knew him, and will be sorely missed.

FVA is off to Brazil for several months vacation. BYE is active on 420 Mc. and working stations up north. VOP has a new call — JAIKW. IZG now is acting as Assistant RM. BAM and ELQ both get BPL cards for March traffic. New mobiles on in Orange County are LRP, EEK, JAN, and LWH. The Coronado Club has elected HQL, pres.; JZB, vice-pres.; Betty Smith, XYL of GMG, comm. secy.; Betty Entner, rec. secy.; Wm. Zoeller, treas.; GMG, entertainment chairman. The Coronado Club has its FB new directory on sale, thanks to the outstanding work of GMG! Many of the Fullerton hams are checking in on the new emergency net on 144 Mc. sponsored by the Radio 60 Club of Whittier. The 75-meter AREC net has moved to 3525 kc. to ease QRM. APG is getting mobile fever again. After three attempts, the Soledad fellows report their poles are up! DUP says he is going to share time on 3.8 Mc. Ex-San Diegoan W6MI, now KL7MF, is working many of his San Diego friends. Thanks for the news this month, fellows. Traffic: WGBAM 898, ELQ 552, IZG 185, FCT 28, EWU 10, FMZ 9.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, N5BKH — Asst. SCM, Joseph G. Bush, 5CDU, SEC: AAO, RMs: GZU, LSN, PAM: IWQ, AHX, FBL, and PTZ are new ECs. The Mineral Wells ARC held an organizational meeting with HRN conducting Wichita Falls. Now meets in its club room signing W6US. The Caravan Club had a get-together at Garland with seventy present. The Dallas ARC enjoyed a social event for members and families. The Abilene ARC elected MKS, pres.; FOQ, vice-pres.; JOJ, secy. The Trophy Cup Contest has been terminated with the congratulations and cup going to NWTEN, with BFA as NCS. LEZ helped the Grand Prairie AREC get organized. Fort Worth AREC is putting fixed station in Red Cross headquarters. Abilene AREC, through the efforts of DVQ, has procured from the city part of the replaced mobile equipment which will give them six amateur mobile units on 29,600 kc. Plans for handling the Easter Pageant traffic were nicely completed with GZU, QHI, JOG, and IWQ carrying the ball mostly on the NTS 'phone traffic net. BRB still insists he is trying to quit traffic, and makes the BPL again! Wonders will never cease. ASA was heard on 3.8-Mc. 'phone. RPH, working marine mobile aboard the ferry SS *Nellis Bee*, hooked T12TG. KAU now is using VFO on his mobile. Traffic: W5LSN 1222, GZU 905, BRB 517, BKH 393, QHI 259, JOG 184, IWQ 174, PTR 152, CVW 138, LEZ 113, GER 50, JQD 42, PPS 34, RHC 32, FPH 23, EBW 18, HBD 18, QQU 14, SGR 14, JUN 12, POG 9, ROH 8, PMS 7, IGU 7, LUY 7.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — Oklahoma County AREC drill this month brought out 12 mobile rigs and 24 fixed stations. EHC is on regular tri-weekly schedule as OBS. AGM is using clamp-tube modulation on his 3.8-Mc. mobile rig. HEV is building a crystal filter for s.a.b. Ex-KL7VO now is W5SLC in Oklahoma City. More than 1200 messages were handled in about 30 hours operating time, about one-third by radiophone, from the Easter Pageant site near Lawton. Traffic was routed over eight channels to various Oklahoma and Texas points, to surrounding states, and more distant places. The cooperation of traffic handlers was wonderful. In addition, nets and individuals not basically traffic-handlers got right in the swim and worked like Trojans. It was tough luck when a caterpillar tractor ripped up two teletype circuits to the message center where traffic was distributed to the various channels. FCP, FOG, and FOM, together with all the members of the Lawton-Fort Sill Club, gave an example of what can be done by proper planning and traffic routing. Interest is running high on mobile operation. With the opening of MARS to civilians, Oklahoma is showing considerable activity in that direction. There is close liaison between ARRL and MARS net activities and the result seems mutually profitable. Your SCM spent a day at Fort Sill looking into the MARS set-up. The Lawton-Fort Sill amateurs seem to cover all phases of amateur activity and do a swell job at it all. Traffic: W5FOM 582, FOG 352, K5WAH 338, W5MRK 336, RIT 211, AHT 207, FCP 126, FEC 100, JHA 70, WQ 62, HFN 52, OQD 51, PHR 38, LCN 22, IOW 15, EHC 11, JKQ 3.

SOUTHERN TEXAS — SCM, Dr. Charles Fernaldigh, W5FF — RGF soon will have 40 watts to 807 on 3.8-, 14-, and 28-Mc. mobile. MN has moved to 14 Mc. for traffic schedule while in the process of putting up new 7-Mc. antenna. SJY is building new rig for 3.5, 7, 14, and 28 Mc. PTV is doing outstanding work with civil defense and Emergency Corps. JFF is on El Paso mobile net at 2 p.m. Sunday on 28,040 kc. NIY is working DX on 14 Mc. PTR still is one of the most active feminine hams I know. H5X is 'phone patching on 3.8 and 28 Mc. with 210 watts to a pair of T240s. IPT is active in MARS Texas 'phone net. AMK has finished working over his rig. LM is busy on 28-Mc. 'phone. LFV is back in the vicinity. RHU is looking for a

(Continued on page 104)

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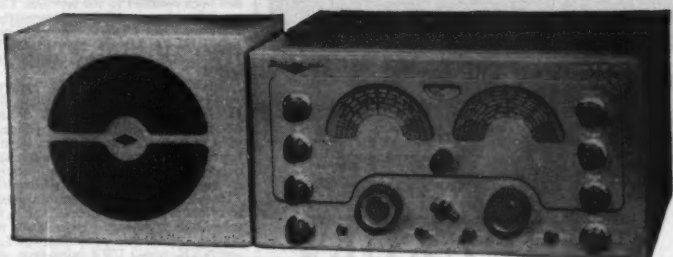
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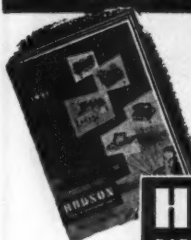
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new receiver. PNP still is working mobile. 2UUN has moved to the vicinity of Temple. ESL is holding out on 7060 kc. JTB is communications officer for local CAP Squadron. QOT busy with MARS activities. QJD still is in the hospital and has all of our wishes for a speedy recovery. NKB is active in STEN, traffic, experimenting, and ragchewing. QOF worked 19 countries on 28-Mc. 'phone with 50 watts input. AQE is active in NTX, OLZ, and STEN. NKM is doing a nice job as OO. New officers of the Houston Amateur Radio Club are RKF, pres.; OZO, vice-pres.; OJS, treas.; OUG, secy.; QGU and LLT, board members. RKF is building a new ham shack. RGA is working 7 Mc. with FB vertical. FWC has a pair of 812s with 260 watts on 1.75, 3.8, 28, 50, and 144 Mc. MDZ now is on 28 and 144 Mc. with 813s. NXD is an NCS for STEN and has a schedule with NTX on 3900 kc. Sun. at 7 A.M. KFY has finished a 420-Mc. converter. EEX has finished new ham shack. BHO is building 3.5-Mc. mobile converter. IUY is on 3.8 Mc. with new vertical. ANZ is on 3.8 Mc. in the morning with 300 watts. FSC is on 50 Mc. and worked HC2OT. LHJ and DKB are doing swell on 3.8 Mc. PKJ and PKO are now on 144 Mc. VB is back on 7 Mc. after years of inactivity and is building 300-watt final. NIT is busy with U. of H. Frontier Fiesta. IPW is back on Houston from U. of Tex. SJY is new AREC member. NN is on 3.8-Mc. 'phone and 7- and 14-Mc. c.w. with 32V-2. QJS is doing fine on 3.8, 28, and 144 Mc. TG has been recalled to the services. IX still is working DX and pounding brass. ADZ is constantly searching for AC4YN. RIH now has Class A license. Traffic: W8PTV 554, PTR 160, RIH 74, JFF 54, MN 53, GUD 18, LHK 16, CVQ 14, FW 9, RFG 9, QOF 8, AQE 7, NBZ 5, ABQ 4, IPT 3, QJF 1.

NEW MEXICO — SCM, Lawrence R. Walsh, W6SMA — Acting SCM, R. J. Matthias, 5BIW, SEC. — L. R. Dr. L. A. Jenson, PAM: BIW, PAM v.h.f.; FAG, The New Mexico 75 Meter Emergency 'Phone Net now is functioning very well on 3838 kc. PLK has been devoting much thought, time, and effort toward emergency organization, as evidenced by his report to the National Emergency Director. A new club has been organized in Albuquerque, called "Hams Associated." Temporary officers have been named as follows: MYP, chairman; QPK, secy.-treas. The Los Alamos Club is meeting twice each month and holding code classes at 7:00 P.M. preceding the 7:30 meeting. New officers are NXE, pres.; UVA, vice-pres. and act. mgr.; and RHZ, secy. The Mesilla Valley Radio Club wound up its first year's activities on Feb. 22nd with a club birthday cake. LWL was named chairman of the MVRG FD committee. New officers are ONP, pres.; RCQ, vice-pres.; RPO, secy.-treas. The Sandia Base Radio Club publishes a bulletin called *Radio Sandia*; the editor is WGW. SBRC officers are IH, pres.; WRS, vice-pres.; FPB, secy.; QPK, treas. At a recent meeting the Club heard a talk by Col. J. H. Sampson, FRP, on the subject of Sandia Amateurs and Emergency Communications. CA spoke at the April 9th meeting on Traffic Handling and Net Operations. CQ-NM, our State bulletin, celebrated its third birthday with the March issue. It is edited and published by NXE and RMH, who have given us good coverage of N.M. news. Traffic: W5ZU 234, A5ZU 174, W5PXX 81, SU 10.

CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ piles up the highest traffic total this month to hand. OM also piles up nice total, mostly on the MTN. EY, HT, and TO report good MTN activity. UC, HH, NN, and II have QRT because of changes in QTH and will be greatly missed by the Halifax gang. DB reports 14-Mc. c.w. not so good. BC, HC, ID, ME, NO, QZ, and TA are among those who have been active on 144 Mc. lately. Reports brought back from G-Land by QZ indicate that RR has the meet outstanding 14-Mc. 'phone from this district. MK got his WAS and WAC on 28 Mc. during March. FFSAW, ex-HB9AW, spent several days with MK and met the Cape Breton boys while en route to FP-Land. QSLs for FFSAW may be sent via MK. DS is back on with Millen on 3.5 Mc. MK, YV, AAK, AL, PS, and DS are quite active in Cabot Flight of AFARS. Reports this month were especially poor because of bad conditions. Traffic: VE1FQ 86, MK 67, OM 52, AAK 46, YV 31, TO 25, HT 24, AL 16, PS 12, MQ 10, KG 9, ZO 8, AA 7, YO 7, ABJ 6, AB 5, CN 5, DB 5, JS 5, KF 5, K1 5, YC 5.]

ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Asst. SCM c.w., W. Guillot, 3BUR; Asst. SCM 'phone, E. Kimble, 3FQ, PH, in Kirkland Lake, has very appropriate plates for his rig — 7388P. OJ, in Ottawa, sports 2-over-6 beam on the house, and getting gear for 9 ready. We welcome DLO to our hobby. AUU, in Belleville, monitors 7267-ke. net. Congrats to BTQ on new jr. operator — a boy! WY enjoys the Florida sunshine. The Ottawa Club held another FB meeting with a talk on vacuum tubes and films. This Club is very keen on 50- and 144-Mc. work and is looking for contacts. EAB continues his code classes. Hamilton Emergency Ten-Meter Net reports good attendances

(Continued on page 108)

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in drills each Sunday night. The BNQ versus RU bowling feud still is on. DH is a newcomer on 144 Mc. BCQ is a proud papa. 7-Mc. conditions are very poor of late. The Frontier Radio Assn. enjoyed viewing the film "Quiet Please" at a recent meeting. Welcome to DEK. IA bagged KH6 on 7 Mc. We are pleased to report that the Quinte Radio Club now is an ARRL affiliate. The arrival of a daughter to the BKR abode is announced. DJA is rebuilding. BBV lost his antenna. BKM enjoys results from newly-erected antenna through the courtesy of BIK, BBV, and BHS. EAP gets out. BOW is active on 50 and 144 Mc. We are happy to report AVK is getting better. AQA now is mobile with emergency rig. Traffic: (Mar.) VESIA 251, BUR 149, ATR 116, WY 70, IL 65, BMG 57, GI 53, APS 49, DGZ 46, BTZ 38, KM 35, AYW 30, BL 30, EAM 30, WN 21, BUG 20, PH 19, NI 18, BPE 14, DJD 10, DH 9, VD 7, BTE 5, DKT 5, BMM 4, OJ 4, BFR 1. (Feb.) VESIL 71, DJD 16, DH 10, TO 3.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — ZF is new EC for Montreal North and West. The Verdun Amateur Radio Club now is affiliated with ARRL. AOR is new VL operator in Notreville, Len, with 30 watts, all c.w. bands. AKH is a new ham in Quebec with 100 watts. QN is kept busy with the Emergency Corps and in putting out the Quebec Club paper, C.A.R. de Quebec, which is a very fine magazine. WH has 30-watt rig in 10 x 17 x 8 cabinet complete with power supply and antenna tuner on 3.5, 7, 14, and 28 Mc. AFC recently passed his 2nd-class commercial exam. XC added an XYL to the shack and moved to Rimouski. ZR has bought a new IYTH and at last report was surveying the site for masts in readiness to erect same when snow and frost disappear. CA reports schedules as usual and he is working VKs in the early mornings. AKJ reports in on PQN and TRN regularly and handles traffic when it offers. LO also is on PQN and TRN regularly but finds traffic light. EC does a lot of ragchewing on 3.8 Mc. and handles some traffic. AT is recovering in Notre Dame Hospital, Montreal, after a very serious operation. Our best wishes for a speedy recovery. ACD now is the leader on 3.8-Mc. phone in Grand Mere. Portable and mobile rigs in the district are being dusted off in readiness for Field Day. Let's all get out and make it bigger and better than ever. Traffic: VE2CA 39, AKJ 27, GL 19, EC 16, LO 11.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — High-light of the month was the retirement of VE6HM from the Railroad after forty-three years' service. Charlie made his last run Monday, April 2nd, and as he stepped down from the cab for the last time was greeted by a host of friends, including a number of the local gang. He also received a telegram offering congratulations from the Calgary gang. EO led the field for Alberta in the recent 88 Contest. OE, NA, IK, and the gang at Medicine Hat did a fine job in the recent emergency when the river went on a rampage. EH has gone mobile on 14 Mc. and has been heard in the Far North. EA is QRL with new house plans. WS has new center-loaded antenna on his mobile. MJ has completed logarithmic compressor, which from all reports seems to work well. EY is back on the job after a spell of sickness. OC has AREC organization well on the way. Charlie Gibson was a recent visitor to Edmonton for GOC conference. Wally B has changed call to XO. VE is reported to have moved to Calgary. DZ has new rig coming up with a little more power. Traffic: VE6OD 66, EO 13, MJ 4.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — ZF now has a work shack and his many projects will be under way. AQS has been seen perilously perched on the roof top tuning a 28-Mc. beam. GP has devoured several handbooks and still the r.f. stays in the shack. DH swears that because the door was open he worked those DX stations and his 25 watts took the easy path out. SH, who is an XYL, seems to have Mike fright. LK, Net Control for the Northern Net, would like a Vancouver station between the house 1930 and 2000 on 3785 kc. Mon. through Sat. Plates for your private cars are still on the agenda but help is required from all of you. Write your Provincial Member, and state that plates are a means of identifying a radio unit working for the good of the cause. From Spring Island our Loran crew reports who is who and where: HZ, 75-meter phone; KF, 80-meter c.w.; OX, 80-meter c.w.; H, Five o'clock and 75-meter phone. OL, of the weather ship, is recuperating after his operation. RN, of Albert Bay, checks into the 5-p.m. net nightly. Traffic: VE7XA 63, ZF 9, AKG 3.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — PAM: VEAFA. Our deepest sympathy to AJ in the loss of his wife. Many thanks to LC who so kindly wrote the column a short while ago and my apologies for not having a report last month. Len's XYL is having a bout with the medics and we all wish her well. EO, from Flin Flon, was in Winnipeg while his XYL underwent an operation. RO finally

(Continued on page 108)

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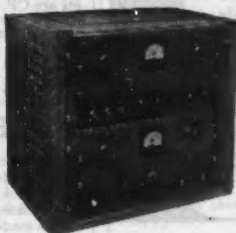


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Personnel Department

NATIONAL UNION RESEARCH DIVISION

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worked 2K2AA after five years. Ex-88 now is signing 288 in Montreal, DU, at Deerwood, is new OP8. Boyd was known as 7BG and 8PN for some time. GW is a new call at Minnedosa and is interested in v.h.f. H8 has a new 'scope and L8 a new rack. IF lost a reflector off his beam in a recent storm. WM is a new call on 75 meters with a pair of 807s and an NC-240D. CS, from Brandon, and HA, from The Pas, have gone East on a course with CNR. KN has a new Commander receiver. A year ago Winnipeg was in the throes of a flood. This year it appears several low-lying districts along the Assiniboine will be flooded. Not much interest is shown in the AREC. In Winnipeg your EC is RP and in Shilo DN. How about getting in touch with them? EC appointments for other districts are open. Interested?

SASKATCHEWAN—SCM, Harold R. Horn, VE5HR—RR is experimenting with radio-controlled model aeroplanes and having good results. NC took advantage of recent aurora borealis disturbances to QSO VE3s and VE7s on 56 Mc. SY now is out of the hospital. RM has n.f.m. and a.m. on all bands with 100 watts. FJ is on 28-Mc. phone. OM has new FB grid-dip oscillator and a new car. HB is heard on 14-Mc. phone occasionally. LD took a trip to W7-land for a load of bees. PJ sends official bulletins on 3791 kc. Mon., Tues., Thurs., and Fri. at 9 p.m. SE reports the Emergency Corps doing well in most areas. He also has 144-Mc. walkie-talkie now. We regret the passing of VE5VA, Morse, Sask., and extend our sympathy to his family. BZ now a VFO and doing a good job as EC Rosetown Area. LQ is on 75-meter phone using clamping tube modulation. MD, HO, and EB are heard between classes on the varsity station. US, RW was promoted and transferred to Edmonton and now signs VE6VK. Latest hams to receive their tickets are CP, DM, LK, LQ, NB, FR, VF, VL, and PL. Welcome to the airwaves, boys. See notice under Hamfest Calendar re coming event at Saskatoon. Traffic: VE5YF 43, BH 23, HR 22, LL 9, PJ 6, FS 2, KJ 2, LE 2, SE 2, WH 2.

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K, and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4½ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

For a list of overseas QSL bureaus, see page 62, this QST.

- W1, K1—J. R. Baker, jr., WIJOJ, Box 232, Ipswich, Mass.
W2, K2—H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3—Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
W4, K4—William M. Rowe, jr., W4JDR, 2430 Connally Drive, East Point, Ga.
W5, K5—L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6—Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7—Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8—Walter Muirgrave, W8NGW, 1294 East 188th, Cleveland 10, Ohio
W9, K9—John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
W0, K0—Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
VE1—L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2—Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3—W. Bert Knowles, VE3QB, Lanark, Ont.
VE4—Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5—Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6—W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
VE7—H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
VE8—Roy Walton, VE8CZ, Box 534, Whitehorse, Y. T.
KP4—E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KZ5—P. C. Combe, KZ5PC, Box 407, Balboa, C. Z.
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VR-6111	30	7 $\frac{1}{2}$ X	3 $\frac{1}{2}$ X	4 $\frac{1}{4}$	5	18.00
VR-6112	60	7 $\frac{1}{2}$ X	3 $\frac{1}{2}$ X	4 $\frac{1}{2}$	8	25.00
VR-6113	120	7 $\frac{1}{2}$ X	3 $\frac{1}{2}$ X	5 $\frac{1}{2}$	14	33.00
VR-6114	250	12 $\frac{1}{2}$ X	5 X	7 $\frac{1}{2}$	25	52.00
VR-6115	500	12 $\frac{1}{2}$ X	5 X	9 $\frac{1}{2}$	45	81.00
VR-6116	1000	14 $\frac{1}{2}$ X	13 $\frac{1}{2}$ X	9 $\frac{1}{2}$	92	135.00
VR-7B	2000	16 $\frac{1}{2}$ X	14 $\frac{1}{2}$ X	12 $\frac{1}{2}$	200	245.00

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Aurora

(Continued from page 10)

Society. Dr. Gartlein's help is particularly appreciated. Much information on amateur aurora observations back to the late '30s was obtained through the cooperation of ARRL. Correspondence with E. M. Brown, W2PAU, was also helpful.

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Radiological Monitoring

(Continued from page 31)

R_2 for minimum voltage and hold the Geiger tube close to a radioactive substance. Turn on the multivibrator and set R_2 for zero reading on the microammeter. Then adjust R_3 to bring the output voltage up to the correct operating level for the Geiger tube in use. At this setting the radioactive source should cause the multivibrator to fire, as indicated by a reading on the microammeter scale.

Never increase the voltage to the point where there is a continuous meter reading in the absence of a source of radiation. The reading should drop to zero whenever the tube is removed from the vicinity of the source, except for a sporadic pulse now and then as a result of cosmic radiation.

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An instrument can only be calibrated in the presence of a radioactive source whose intensity and radiation geometry are well known or in conjunction with an instrument that has been previously calibrated. The latter method is the only practical one when thousands of instruments are involved. All commercially-built instruments are calibrated by the manufacturer. Since almost every state is now purchasing some commercially-built instruments it should be quite simple to check homemade instruments against one of the many available at civil defense headquarters. The two instruments should be placed in turn at exactly the same spot with respect to a source of radioactivity. The readings on the calibrated instrument can then be used to calibrate the scale of the new instrument. A selection of calibration points, at various sensitivity settings of the meter, can be obtained by varying the distance between the instruments and the radioactive source.

[The third and concluding part of this article will describe the construction of an ionization-chamber type instrument for radiological detection. — Ed.]

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Happenings

(Continued from page 41)

Initial opposition to a \$1500 assessment against the State Highway Department for dies was overcome by amending the original bill to raise the license fee from \$1 to \$3. W7ZT invited members of the Legislative committee studying the bill to view his station in operation handling traffic from GIs overseas, an action which favorably impressed the legislators. Amateurs throughout the state threw their full weight behind the bill, writing their legislators urging support.

The license plate bill in New Mexico failed to pass, after being favorably reported out of committee, chief obstacle being the state law requiring payment of a personal property tax on the vehicle at the time the licenses are issued and transfer of the plates with the vehicle when it is sold. The Minnesota bill has just been signed by the Governor; details in a later issue of QST.

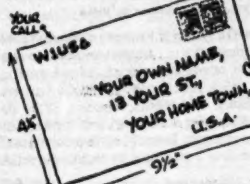
PRESIDENT'S POLICY REPORT

After a year of study during which it concentrated on such things as possible mergers of various commercial communications facilities to strengthen them economically, and the relationship of Government to non-Government apportionment of the frequency spectrum in this country, the President's Communications Policy Board has now issued its report. The primary conclusion is a recommendation for the establishment of a three-man Telecommunications Advisory Board to formulate a national policy, which is said to be sadly lacking at present, and to act as direct consultants to the President. The report compiles such expressions of national policy as it has been able to find in print, or as generally-accepted fact, and in the latter category deals with the amateur service as follows:

1. The Amateur Service shall be fostered and encouraged because the immediate availability to all world areas of the Amateur Service's frequencies and the amateurs who utilize them is vital during times of emergency, whether such emergency be of a localized nature or national in scope.
2. The United States considers its own Amateur Service to be vitally necessary to the national defense and security because it provides a pool of personnel trained in the techniques of telecommunications, including skilled operators.

Copies of the report may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at \$1 each.

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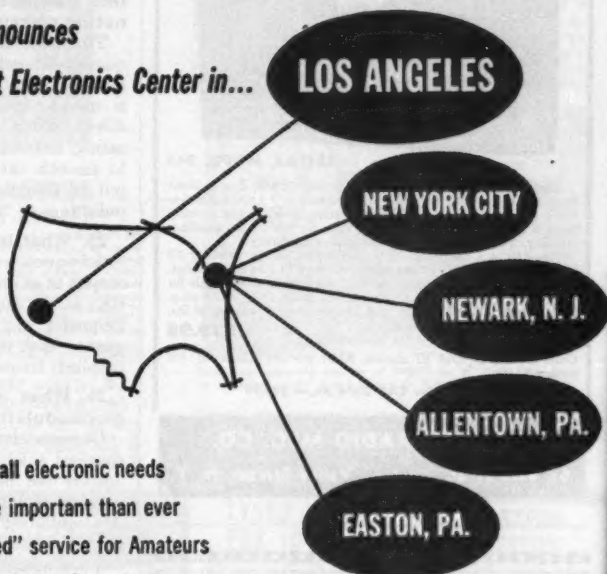


SEE PAGE 108

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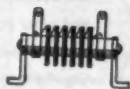
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Novice Exam

(Continued from page 46)

rent is $2 \times 50 = 100$ milliamperes, or 0.1 ampere. The power input is therefore $500 \times 0.1 = 50$ watts.)

24. Why are a rectifier and filter required in the plate power supply system of an amateur transmitter when operated from alternating current?

The amateur regulations require that an adequately-filtered plate supply be used on transmitters operating below 144 Mc. The rectifier is used to convert the alternating current into direct current. However, its d.c. output is pulsating, not constant, and the filter must be used to smooth out the pulsations so that the output is essentially "pure" — that is, free from pulsations or "ripple."

25. What is a frequency multiplier?

A frequency multiplier is a device that delivers output at an integral multiple (i.e., 2, 3, 4 times, etc.) of the applied frequency. The output of a frequency multiplier is consequently on a frequency that is a harmonic of the fundamental (applied) frequency.

26. What are the undesirable effects of overmodulation in radiotelephony?

Overmodulation results in the generation of spurious sidebands — that is, frequencies lying outside the band of frequencies or "channel" actually required for transmitting the information contained in the modulation. These spurious frequencies, called "splatter," will interfere with communication on near-by channels and may even lie outside an amateur band. At close range they may also cause interference with broadcast reception.

27. What is meant by a "parasitic" oscillation?

A parasitic oscillation is one not essential to the operation of the equipment and usually occurring on a frequency considerably removed from the operating frequency.

28. What is the purpose of a "key-click filter" and when should it be used?

The purpose of a key-click filter is to reduce spurious radiation generated when keying a radiotelegraph transmitter. It should be used whenever required for suppressing such spurious radiations.

—J. H. & G. G.

V.H.F. QSO Party

(Continued from page 58)

a QSO counts 1 or 5 points. Cross-band work shall not count.

5) A "contestant" is a single operator working without the help of any other person. Results may be presented with names of all participating persons, for listing, but only single-operator scores will be considered for certificates.

6) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 5 points for completed two-way section exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different
(Continued on page 116)

"Worked 53 countries — over 1,000 QSO's in less than five weeks with a Lyso 600 Transmaster..."



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Temporary operating position of F9BAW on St. Pierre (St. Pierre de Miquelon). Inset shows Gerard de Buren, F9BAW (EX-19BAW)

Gerard, who now makes his home in New York, proved the value of Lyso Transmasters for portable operation. All gear was carried from New York to St. Pierre in order to give the hams an opportunity to work this elusive country.

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Gonset's sensational 2-meter superheterodyne converter. Designed for use with any auto radio, home BC set, or communications receiver for "hot", dual conversion 2-meter reception!

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mobile or home antenna! • Etc., etc., etc.!

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Battery is recommended.

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BAND	TUBES USED	MODEL — PRICE (with tubes)	MODEL — PRICE (less tubes)
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10-11 Meters	3-6V6GT	B120T \$33.55	B120 \$28.95
20 Meters	3-6AQ5	A114T \$33.55	A114 \$28.95
20 Meters	3-6V6GT	B114T \$33.55	B114 \$28.95
75 Meters	3-6AQ5	A175T \$33.55	A175 \$28.95
75 Meters	3-6V6GT	B175T \$33.55	B175 \$28.95

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LAF	TS33	TS111CP	TS243
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1208	TS34/AP	TS155B/AP	TS270A
1222	TS34A/AP	TS173/UR	TS2323
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TS13	TS47APR	TS195	TSX-4SE

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ARRL sections worked; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted.

7) A contact per band may be counted for each different station worked. Example: WISNK (R. Mass.) works W1EIO (Maine) on 50, 144 and 220 Mc. for complete exchanges. This gives WISNK 7 points (1 + 1 + 5 = 7) and also 3 section-multiplier credits. (If more Maine stations are subsequently contacted on these bands they do not add to the multiplier but they do pay off in additional contact points.)

8) Each section multiplier requires actual completed exchanges with of least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

9) Award Committee decisions shall be accepted as final.

10) All reports must be postmarked no later than June 27, 1951, to be entered for awards. (See p. 55, May, 1948, QST, for form or a message to Hq. will bring a mimeographed blank for report on this contest.

Reporting

Submit contest logs to Headquarters immediately, even if your score is small, to help in cross-checking the claims of others.

— F. E. H.

How's DX?

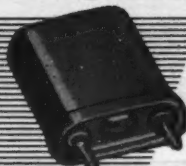
(Continued from page 58)

perhaps you can use a few of those to follow. . . . Though the amateur radio situation in Indonesia is growing no better speedily, PK1LZ continues as QSL chief for NIVIRA at Dj Purnawarman 47, Bandoeng, Java.

C3KK
FG7XA
FG7XB
FG7BX
FR7ZA
G8FYI
HK5GZ
HR1KE
HS1VR
JA2WM
JA4CR
KC6WC
KH6ACL/KP6
ex-KR6CN
OZ2RD
PJ5ZO
ex-PK1LK
PZ1QM
SV8AB
TDRK
VE8AJ
ex-VP3MCB
VP3VN
VP7NP
VP7NS
VR2CF
VR2CG
W2AQE/KM6
XE1XB
ZE4JE
4X4DA
984AC

P. O. Box 226, Taipei, Formosa
(QSL via ARRL)
(QSL via ARRL)
(QSL via WIGKK)
Box 330, St. Denis, Reunion Island
(QSL via R5GB)
% American Consulate, Cali, Colombia
Box 67, Tegucigalpa, Honduras
V. Rojanasaroj, % Army Signals Corps,
Bangkok, Thailand
R. W. Morris, DAC PHW GHQ SCAP,
APO 500, % PM, San Francisco, Calif.
APO 9, % PM, San Francisco, Calif.
CIVAD, No. 3054, FPO, San Francisco,
Calif.
(QSL to KH6ACL)
Sgt. R. L. Daly, RA 19305422, Co. No. 1,
8228 Army Unit, APO 59, % PM, San
Francisco, Calif.
(ex-OY3RD/OZ7RD) Niels Storgaard,
Borkevej 7, Nr. Nebel, Denmark
(QSL via ARRL)
John H. Van Balen, Hotel Amsterdam,
Valkenburg (L), Holland
100 Prinsessestr., Paramaribo, Surinam
(W2SUC) A. Spiro, % UNSCOB,
Salonika, Greece
(QSL to TG9RB)
Tom Harper, Ennadai Lake, NWT, via
Ft. Churchill, Manitoba, Canada
6 Sixth St., New Toronto, Ontario,
Canada
146 Sixth Street, Georgetown, British
Guiana
Zoland Zeitz, Alice Town Bimini, Ba-
hamas
Robt. E. Steele, Grand Bahama, Ba-
hamas
Johnston, % Sergeants Mess, Lauthals
Bay, Fiji Islands
(ex-ZL3LR) Nadi Airport, Fiji Islands
VR-21 Det., Navy 3080, FPO, San
Francisco, Calif.
Jose Gracida B., Alhambra 620-4,
Mexico 13, D. F., Mexico
Box 122, Gatooma, Southern Rhodesia
P. O. Box 2820, Tel-Aviv, Israel
Mathias Stemmerich, Saarbruckerstr. 98,
Homburg, Saar
(Continued on page 118)

Pacing the Field



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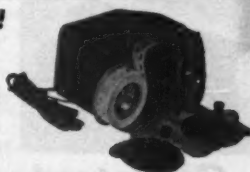
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Friedrichthal, Saar
984AH Walter Meyer, Schillerstr. 9, Quierschied,
Saar

By the way, a stamped self-addressed envelope should go along with your FP8BX-bound card to W1GKK if you desire one in return—and who doesn't? W1s GKK IKE ODW RWS, W2a CTO JBL TWC TXB ZVS, W3DLI, W5FXN, W6a ALQ EUV NTR, W7s JYZ VY, W9a CFT GMZ HUZ KA, W9BAF, G3BQJ, HC2JR, JA2CS, KH6KL, VE1JD, VP7NM, R. Van Rokowski and the So. Calif. DX Club helped furnish the bearings this month.

Tidbits:

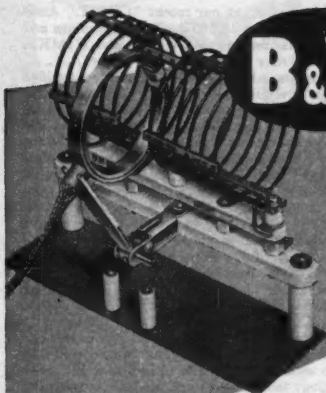
The pirate activity of one VP7NX is a bane to Bahamas QSL manager VP7NM. U. S. personnel stationed down there have a pretty fair deal in being permitted to operate. We hope they'll do all in their power to blot out clandestine QSOing by unlicensed colleagues as the case may be. Less unhappy VP7 notes: VP7NM contributes the most consistent c.w. operation and has, among other awards, WAC.



One of the more widely worked 28-Mc. 'phones is Canary Islander EA8AX. (Photo via W2ZV/S)

WAS and DXCC for less than a year of operation. VP7NH works a lot of 'phone on four DX bands and VP7NR does likewise. VP7NJ is a government magistrate on Harbour Island and ex-VP7NQ may now be reached at 35 Friends Road, Norwich, Norfolk, England. Maximum input power in the Bahamas is set at 150 watts. Word from PK1LZ has it that all stations in his area were closed down and equipment taken over by authorities. Postage rates to foreign points have tripled recently. PK1LZ would appreciate receipt of any unwanted radio literature in the form of books, magazines or pamphlets. Let's pull for an early back-on-the-air for Cor and his NIVIRA mates. Mr. and Mrs. Walter W. Richard of Havana, perhaps better known as CM9AA and CM2AC, gave the flock a thrill by putting Guadeloupe on the air for some two weeks. 170 pounds of gear including a 50-watt transmitter radiated the eagerly sought signs of FG7s XA and XB at Point-a-Pitre. With F3RR dispensing FR7ZA QSOs from Reunion, DXers have been given two new countries to chalk off the list these past weeks. Two other vacationists, YV5s AE and AO, were extended typical ham hospitality by VP6s CJ FO JC PV SD and WR during a Barbados visit. G3BY would like it known that he does not work 20 meters despite arrival of QSLs to that effect. Man, no prefix is safe from theft nowadays. CZ2AC, PX1A, ZA2AA and 3A1A will by now have been deleted from all DXCC totals, QSLs notwithstanding. This also acknowledges that the expedition of DL4FS to Monaco as 3A2AB constituted, so far as we know, the first amateur operation in that country. VE3CJ had such a jolly session as VP5BP during the DX Test that he intends to encore next year. During his 10-day Caymans stay Noel tallied 377 QSOs, mostly using 14-Mc. 'phone. Frequent contributor John DeMeyer is assisting EA9AB to acquire some fancy beam equipment. The future fat signal out of Spanish Guinea will have to in part be credited to the efforts of this Lansing listener. W4RXP and W1PVF ran into snags regarding their projected joining of FP8s AW and BX on St. Pierre. They're still plugging, though, and another FP8 is a good possibility. The

(Continued on page 180)

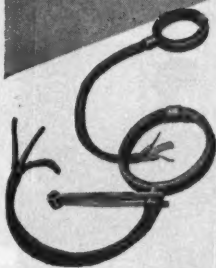


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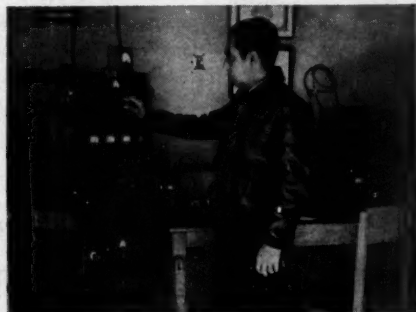
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ears of W1SIO perked up at our recent "CQ VT." Andy has 400 watts of 'phone on 14.270 kc. during evenings and week ends. He further reports that W1FPS and W1MKM QSL thoroughly and may both be found on 20 c.w. Prior to his induction into the forces, Bud Rugel notified us that ZM6AF is now QRT and will be replaced by another ZL amateur. Also, that CM9AA will not hit PX- or 3A2-land as formerly planned. The 75-watter of VP4LZ is being manned by none other than ex-W1EEC/KW6, says W1QXX and Z82X would like some gen re the up-to-date addresses of KJ6AF and CR19AA. Bad luck took a swipe at VK3AGW. Fire destroyed his home, ham gear, logs, QSLs, et al. Arnold is particularly interested in replacing his VK4BI/VK9BI file as he will soon return to Papua and a chance to add to his 60-odd countries worked from that area. So, if you've worked either of those calls, you could do VK3AGW a good turn by shipping him another veri. W1S1J has a 60-watt rig all set to go as JA2WM. He'll use both 'phone and c.w. and will be hearing with an SX-71. "The Darlington members of the RSGB will be operating a 'Festival of Britain' station from the South Park, Darlington. The call sign will be G3FYI and the transmitter will run 150 watts to 813s with T240s modulating; the receivers will be Eddystones. The dates will be those included between 8 June and 8 July. We shall be looking for W contacts on 20 'phone. . . ." So



Miguel Angel Delgado H. of Caracas tunes up the rig at YV5AB. The first Venezuelan 'phone DXCC award went to this station. YV5AB is active on all amateur bands from 75 through 2 meters. Maximum power used is 125 watts.

writes G3BQJ from Co. Durham. From W2TXB: VS6BE knocked off for leave until September or October and W2SUC of SV#UN and SV#AB was preparing to return Bronxward. JA2DS wonders if he's hearing the same r. a. c. signals on 20 meters by which we are troubled and W9OLU/4 wishes to correct us in that he now ops K4WCC rather than K4USA. RSGB's G2MI & family had a rough bout with the British flu epidemic and VP1NW has relieved W8YGR of QSL responsibilities. FF8AC told W3BXE that he QSLs 100 per cent REF/ARRL, or direct upon receipt of IHCs. Jack still struggles to confirm Antarctica with 5 of 'em in the log. A route for a confirmation to and from ZD2G is a goal of W9LHS while HB9IH tells W2TWC that he would like to run into a Vermont QSO on 20 c.w., 14,100 kc. preferred. W9ARH seeks information regarding SV1CS and a card from Mexico reveals that 28-Mc. specialist W4MKB has been hobnobbing personally with XE1PY. Ex-KR6CN, though now in Korea, guarantees to answer QSLs confirming Okinawa contacts if same are sent to the address listed in the "Where" section. 4X4DA figured 'twas about time to have his QTH publicized inasmuch as he's been able to confirm but 10 out of 45 countries worked. Bob works 10 through 80 meters, c.w. or 'phone.

Indicted last year for maintaining an undecipherable Field Day log, Jeeves has taken pains to be fully prepared this time. He just came home with a pen purchased on the guarantee that it will write under beer.

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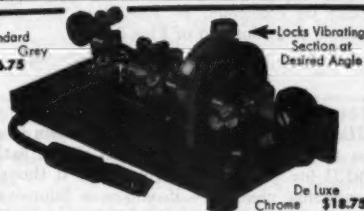
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TC-6	2"	9-pin

Write for Drawings.

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2-Meter Mobile

(Continued from page 81)

crystal-controlled. The frequency will change only slightly as C_1 is rotated, in this case. If there is a tendency to self-oscillation move L_2 nearer to L_1 until only crystal oscillation remains. If there should be two frequencies, both crystal-controlled, L_2 is resonated at too high a frequency by the capacitance of the crystal and its holder. The grid-dipper is handy here; adjust L_2 for resonance at about 68 Mc. if a grid-dip meter is used, otherwise increase its inductance gradually until the two-frequency condition is completely cleared up.

Next connect a low-range milliammeter in series with R_4 to measure grid current in the final. Resonate L_3 at 144 Mc. and adjust the coupling between L_3 and L_4 for maximum grid current, retuning C_2 as this is done. Then adjust C_6 to increase the output by adding regeneration, making sure that it is left set well below the point at which the doubler section of the 12AT7 tends to self-oscillate.

It should be possible to develop around 3 ma. grid current with 150 volts on the 12AT7. Now tune C_3 through resonance, watching the grid current meanwhile. If there is a kick downward in grid current, adjust C_9 carefully until it disappears. Now we are ready to check the final stage with plate and screen voltage applied. A blue-bead (6-8 volts, 250 ma.) pilot lamp makes a suitable dummy load.

Adjust C_5 for maximum output indication. This should appear at the same point on the tuning condenser as maximum grid current and minimum plate current. A slight retouching of C_9 may be necessary, and when this is done, the transmitter is ready for use. The plate voltage may be increased to 200, and the operating conditions will then be about as follows: 12AT7 total drain, both sections — 35 ma.; 6AK5 plate and screen current — 30 ma., of which about 22 ma. is plate current; 6AK5 grid current — 5 ma.; output — about 2 to 2 1/2 watts.

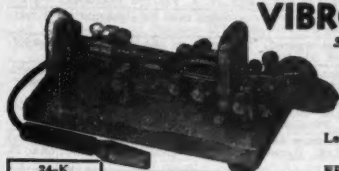
FEED-BACK

In Fig. 1 on page 46 of the April issue (Herbstreit, "Automatic Spacing of Letters and Words for the Electronic Key"), condensers C_7 and C_{11} should be connected to Pins 2 of the multi-vibrator tubes instead of Pins 5.

Strays

Having one of the world's largest ham beams (see October, 1950, QST cover) didn't satisfy W9EH for long. Spring brings with it thoughts of antenna changes — if you're a ham — and Lee is going to work on that 125-foot-high colossus. This time it will be an 18-element 28-Mc. array at the top, with the lower half converted to a 3-over-3 for 14 Mc. Just goes to show you can't keep a good man down or a good antenna up!

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(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 10¢, \$1.75 up. Stamp for samples. Griffith, WJFSW, 1042 Pine Heights, Baltimore 29, Md.

CONVENTION ARRL National Convention in Seattle July 27, 28, 29th, 1951. Plan your vacation in the great Northwest during Seattle Centennial year. The time of your life! General Chairman: WRT, 1921 Atlantic St., Seattle 44, Wash.

WANTED: Marconi coherent magnetron detector. Multiple tuner; deForest responder and other gear prior to 1920, Franklin Wingard, Rock Island, Ill.

MOTOROLA used communication equipment bought and sold. WISCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, WJLCA.

CRYSTALS: Bassett precision Type 100A (FT-243) within 80, 40, 20 meter bands or MARS channels at \$1.50 each. Specify exact frequency and include postage. Rex Bassett, Inc., Bassett Building, Fort Lauderdale, Florida.

WANTED: Teletype 1/60TH HP synchronous motor. Walth, Moraga, Calif.

WSL's-SWL's. Meade, WJKXL, 1507 Central Avenue, Kansas City, Kansas.

PHONE patch schematics, practical discussion. \$1.00. Nichols, WIMRK.

WANTED: Complete or nearly complete files of Southern Edition of QST only, from January 1935 to December 1942, both inclusive. Most copies were identified by publisher at bottom of last or next-to-last page before back cover. Must have both covers and be in good condition. Sumner B. Young, W6CO, Route 3, Wayzata, Minn.

TUBES: Hard to get? Send want list for quotations. Standard brands only. Quantity discounts available. Telradco, Box 108, Elizabeth, N. J.

QSLs, SWLs. They're better. Samples. C. Fritz, 1213 Briargate, Joliet, Ill.

QSLs: Uncle Fred QSLs. Three color QSLs and up. Rainbow Map QSLs. DX QSLs. Bargain QSLs. Samples rushed, 10¢. Uncle Fred, Box 86, Lynn, Penna.

HAMFEST TIME: June 3, 1951. Come to Camp Ki-Shau-Wau where The Starved Rock Radio Club will again hold another big Hamfest. Follow Hamfest signs South from Junction of Illinois Routes 178 and 71 or East on blacktop road from Route 31 at Tonic, Illinois. One dollar advance registration, or one-half at the gate. For additional information write: W9MKL, Ursa, Illinois.

QSLs. Samples. Noble Press, Chatham, Mass.

FOR Sale: BC-610E and BC-614E. In good condition; few changes, running time and line voltage meters added. B&W TVH coils for final. Exciter coils 160 through 10 meters. Full set of spare tubes, one 250TH, two 100TH tubes included. \$550.00 or best offer. Will accept in deal compact high voltage power supply and 10 amp Autotransformer. Walter Roster, W5QFZ, Rt. 2, Box 149, Biloxi, Miss.

\$500 buys a complete amateur station. All commercial equipment. 150 watt Subroc 75-T all-band phone and C-w. xmitter. 828 final. Melaner ECO, Ant. tuner. BC-221 freq. meter. Varic. 3 El. Work-shop 10-m. beam rotator. selym indicators. HQ-129-X. VHF-152A. R9'er. Q5'er. 10-104 mikes. Vitecolex. phones. spare xmitter tubes. spare parts, plus and beautiful 40 Mc. xmitter-recvr. Like new and in operation. Will not sell separately. No trades. Deliver within 100 miles of Philadelphia. WJCLP, 1332 Kynlynn Dr., Wilmington, Del. Phone Holly Oak 8-1587.

SELL: BC-654A portable transmitter/receiver, TCS-10 equipment, RA-34H, TBL-13 transmitter, BC-342N receiver, TBY technical manuals. T. Clark Howard, 46 Mt. Vernon St., Boston 8, Mass.

WANTED: TS/34/AP oscilloscope, any condition. Crest Laboratories, 2117 Mett. Rd., Rockaway, N. Y. Tel. Far Rockaway 7-2723.

BEAMS and antenna elements. Send card for information. Riverside Tool Co., Box 87, Riverside, Ill.

PRINTING press wanted. "Kelley" or any used hand-operated. WADED, Holland, Mich.

FOR Sale: Johnson Viking 1, factory wired and tested, complete with all tubes, 10 through 160 meters phone or CW; \$225. Address inquiries to WAFNE, 760 Poole Dr., Fayetteville, N. C.

SELL: QST, June 1930 to May 1951 complete. R. McConnell, 151 Center Ave., Pittsburgh 2, Penna.

BANTAM Transmitter Manual for Emergency, Novice and general amateur use. \$1.00. Byron Lindsey, W4BIW, Box 3281, Sta. F, Atlanta, Ga.

WANTED: Xtal for BC-348. Stanley Butkiewicz, W9CEW, Omro, Wis.

WANTED: Dynamometer and mounting base, DV-11, DV-12, DV-12A or DV-17 for ART-13. Dynamometer DM-28 for BC-348. NBFM adapter for HRO-7. Tape keying head. Teletype equipment. Books on acoustics, noise, sound. Longley, W2ANB, Sugarland, N. Y.

BOUND volumes QST Nos. 6, 7, 8, 9, 10, 11, 12 for sale. Best offer. Copies perfect. Bindings almost so. R. B. Parker, 38 Ayer Lane, Harwichport, Mass.

QSLs. Samples. Larry's QSLs Opportunity, Wash.

COLLINS, National, Hallicrafters, RME, Lyco, Gon-Set, Eidico, Harvey-Weiss, Stancor, Melshner and Johnson communications equipment available for cash, terms, or with trade-ins at Evans Radio, Box 312, Concord, N. H.

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SELL: Speltone condx: Hammarlund Pro 400X, complete. Used little: \$250 VHF 152A, \$50; new BC-2210 orig. xtal & bk. \$50; Weston tube checker, \$35. R. Long, 184 L St., So. Boston, Mass.

VHF-152A converter for sale. Excellent condition. Manual included. \$60. R. M. Smith, College Highway, Greeley, Colo.

WANTED: Collins 32V2, 75A1 or 2, 10 over 20, 3-el. beam. Give cash price, condition and parts included. W8RWZ, C. Buchanan, R.R. 1, Vale Rd., Springfield, Ohio.

WANTED: BC-344-D unaltered, and as new inside and out. W8-GWA.

PAY cash for Collins 75A1. Must be in excellent condx. Will pick up anywhere So. Calif. W6HCX, J. Krentz, P. O. Box 578, China Lake, Calif.

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SELL: 2 L.M.-13 frequency meters with books. J. Jeransky, W2MHH, 72 Halsey Street, Farmingdale, L. I., N. Y.

ELIDCO TRI transmitter, 200 watts. All bands fone and c.w. Best offer. Bernard McConnell, 551 W. 174th St., N. Y. C.

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SELL, trade deForest's radio course, perfect. Want Silver 701 or similar. Hi-voltage supplies. Vaughn, W7MXE, Box 546, Eugene, Oregon.

FOR Sale or trade for Collins 310B 160 watt fone/c.w. xmitter, good rig for a Ham. Also two 1250 volt 450 Ma. pwr. supp. two 1250 volt 500 Ma. pwr. supplies, 500 watt Multimatch Modulator with speech amplifier. Write for complete details or see W. L. Brown, 518 Patrick St., Portsmouth, Va. WASIV.

200 watt phone, Hallicrafters SX-16, 12" speaker, all \$115 Testers Precision 912, Vornax 900, Cloughbrenge condenser, oscillator, RCA scope, all \$200. Riders, Sams' JSTs, tubes. W2ARA, A. Adamo, 216 Landis Ave., Vineland, N. J.

FOR Sale: name your own price: good usable surplus gear. SCR-522 receiver & transmitter; converted receiver variable tuning; excellent operating condx. BC-455 and BC-454 recvrs, 40 and 80 meters; converted to AC. BC-375E with tubes. Dynamometer and 40M tuning unit. GC-9 hi-freq. xmitter, 2 to 16 Mcs. Webster Wire recorder. Amplifier needs work. All F.o.b. John H. Ashley, Box 254, Ware Shoals, S. C.

JOHNSON Viking transmitter wired and tested by professional electronics laboratory with following extra features: special black cracked and engraved panel added 10 pfd, 1500 volt h.v. filter capacitor, extra i.v. filter and by-pass condensers, 12 v. fil. transformer for 4122 final with higher plate dissipation rating, plus spare 4D5, 6X4, \$300 F.o.b. Pasadena. Sycamore 2-4183, A. E. Acker, W6USQ.

DIODE probe tube, 5/81. IN34 tube, 79¢. Sell your surplus tubes and gear. Send list, best price. "TAB", 109 Liberty St., NYC.

NEW crystals for all commercial services at economical prices, also reprinting or replacement crystals for broadcast, Motorola, Link, G-E, and other commercial types. Over fifteen years of satisfaction and fast service! Edison Electronic Co., phone 3901, Temple, Texas.

1 Kw xmitter \$150 or trade for good rcvr. L.A. area. W6UQQ, 2630 Jefferson St., Long Beach, Calif. TE 48955.

QSL, SWL cards. Samples, prices on request. Printing Products, 412 Court St., Jackson, Mississippi.

KW 20 meter final, gp 813s, B&W HDVL plate and Jr grid coils, Johnson dual 50-700 v condenser, 14 x 19 rack panel, meter, extra or 813s, \$50. Power supply 1700v-500 Ma, dual choke input filter, 866A rectifiers, all parts heavy duty. \$40, 200 watt modulator and speech amplifier, 6S17, 6SN7, 6P6s, 6P81As, 814 x 19 rack mount, speaker amplifier separate unit, \$40. W4MQC, Howard Pike, 490 SE 2nd Street, Hialeah, Fla.

WANTED: Radio officers for Merchant Marine, \$400 per month. Should have FCC tel. Lic. and Coast Guard officers lic. and 6 mos. experience. Write: Radio Officers Union AFL, 1440 Broadway, New York 18, N. Y.

SWAP 10" TV with Mallory-DuMont front end, also all kinds of Ham gear, for Panadaptor, wire recorder unit, surplus (ARC-1, ARC-3, "TS" units, etc.), and Lab equipment, or will pay top cash. Little, Fairbills, Box 26, Dayton 9, Ohio.

CARDS, QSL'S, SWLS? Modernistic? Cartoons? Photographic? QSL specialists! Samples 10¢. Sakers, WDED, Holland, Mich. QSL's unbeatable!

MILLEN 9081 Brand new, \$50. BC-312, \$60. V, RVR, Box 272, Worcester 1, Mass.

VKING I assembled with tubes for \$200 or SX-71. Or best offer. Bob Bretz, WJYS, 1835 Catherine, Santa Clara, Calif.

QSL'S, SWLS. High quality. Reasonable prices. Samples. Bob Teach-out, WIFSV, 40 Elm Street, Rutland, Vt.

FOR Sale or trade: 10" circular saw, 24" jig saw, belt and disc sander, Busch Freeman, 24 x 3 1/2, flash gun, G-E light meter, Gadget Bag, etc. Wap: RME VHF 152, VFO 10 meter beam, rcvr and transmitter. WIRIZ, 2721 Lardner St., Phila. 24, Penna.

TRANSMITTER built by Frank C. Jones late in 1947, cathode modulated PP 813. Complete with coils for ten, twenty and forty meters and tubes. In nearly new condx. A 500-watt phone in a 3 grey cabinet, with symmetrically placed controls and four meters. Looks like a Collins. Built-in VFO and speech amplifier with all pwr supplies in one compact unit. \$375. Owner giving up ham radio. A. W. Wood, WALAN, Hopkinsville, Ky.

SHORT wave diathermies traded in on 1951 models, 200 to 500 watts output. Transformers, tubes, meters, condensers alone worth more than we're asking. \$25. F.o.b. Chicago. Medical Arts Supply Co., 300 S. Wolcott Ave., Chicago 12, Ill.

WANTED: Marconi magnetic detector, de Forest responder, any Electro Importing Co. apparatus, any Wireless Specialty apparatus. Marconi code records. List of member stations of 1914 and 1915; leydon jars, Murdoch tuning coils, Cash or swap QSL's. Wireless Age. Electrical Experimenters. Louis Riscio, WIAAT, 100 Bay View, Salem, Mass.

WANTED: 115 volt AC power plant, 750 to 1000 watts, gasoline powered. Good condx. State price and make. WJALX, 934 Wyoming St., Allentown, Penna.

LYSCO "600" TVI proof Transmitter. \$90. Roger Jensen, W9JDT, 1105 Washington Ave., Racine, Wis.

SELL: Potted transformer 6000 volts C.T., 600 Ma., 110 volt primary. \$35 F.o.b. Larchmont, W2QUJ.

WILL swap tip top shape units: TS121A, R56A, T50A, CN11A for good transmitter. W5RKO, P. O. Box 383, Reserve, La.

FOR Sale: J50-watt transmitter, pair 8005 in final, 811 modulators, exciter and 1500-1250 volt power supply in 36 in. cabinet rack. Also Meissner EX signal shifter; McMurdo Silver 701 transmitter with power supply; Astatic T-3 mike with push-to-talk stand. Make me an offer for any or all of the above. All inquiries ans'd. G. Turner, W1QWI, Nantucket Island, Mass.

FOR Sale: J50-watt transmitter, pair 8005 in final, 811 modulators, exciter and 1500-1250 volt power supply in 36 in. cabinet rack. Also Meissner EX signal shifter; McMurdo Silver 701 transmitter with power supply; Astatic T-3 mike with push-to-talk stand. Make me an offer for any or all of the above. All inquiries ans'd. G. Turner, W1QWI, Nantucket Island, Mass.

WANTED: 25 µd 32KV vacuum condensers, similar to type used in BC-510 transmitters Edmac, Ampers, etc. Also approximately .001-.000 volt by-pass condensers, cast aluminum ends or bakelite cases. W9AU.

MAKE offer for lot: new surplus: 33 1/2" meters 0-1 amp. 0-8 r.f. amp. 0-200 mls.; transformers; plate (output) 2500 volts at 400 mls or 2000 volts at 400 mls, filament 2.5 volt 10 amp. 10,000 volt ins.; 3 chokes, 9/60 henr. 400/050 amp. 10,000 volt ins. 16 henr. 450 amp. 6000 volt ins. 14/10 henr. .045/145 amp. 3500 volt ins. 4 capacitors, 3 µd, 4000 volt; tubes; 4/666, 4/607, 2/805, 2/813; 2/814 rockets. New 1 Guardian relay K-100, 1 B&W CX45C capacitor; 1 B&W 40 HDL coil; bar and brackets. Schofield, Diamond St., St. Albans, Vt.

WANTED: Someone to do mobile installation job (Within 100 miles NYC.) Also want 185.50, mobile equipment. Box 104, Dyker Station, Brooklyn 28, N. Y.

SELL: National NC-57 receiver and "S" meter. In excellent condx. Best offer over \$75. W9MQI, 1041 Jackson St., Marinette, Wis.

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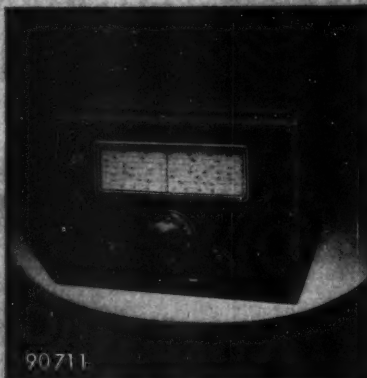
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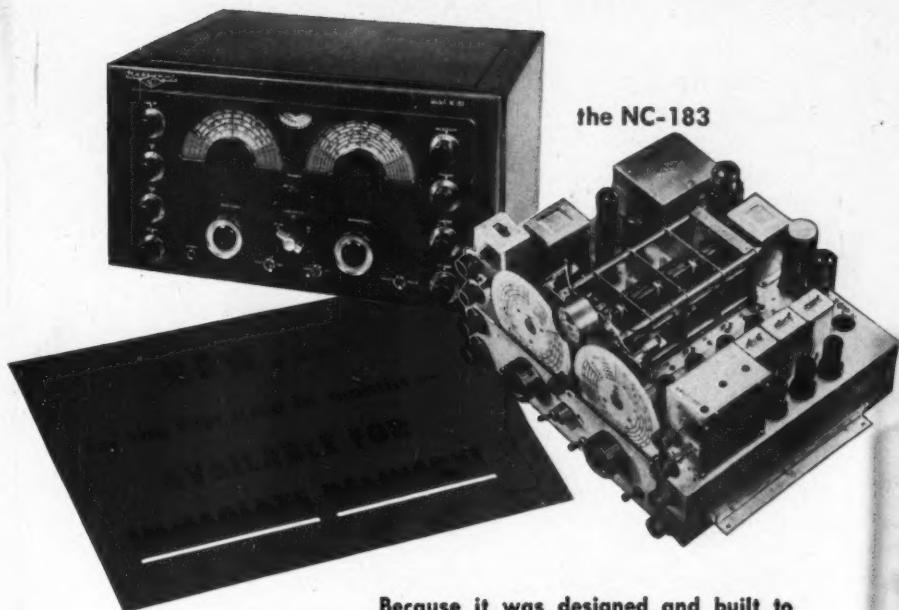
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